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TYPHOID FEVER: CLINICAL FEATURES

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DIAGNOSIS

Typhoid fever has two components, a bacteraemia with its commensurate toxaemia, and an enteritis. While either may predominate, the commonest early symptoms are of bacteraemic origin—persistent headache, apathy, anorexia, and generalized body pains. A harsh, dry cough is common and epistaxis occurs in about 10% of cases. Even at this early stage some abdominal complaint is present—usually constipation, occasionally diarrhoea and abdominal discomfort.

On examination, pyrexia with a relatively slow pulse is a constant finding, plus a dry furred tongue and a slightly distended abdomen. Both 'rose spots' and splenomegaly are important diagnostically, the former invisible on coloured skins and neither constantly present. In South Africa, any patient with an illness of insidious onset running a continuous pyrexia of up to 104°F for over a week is most likely suffering from typhoid fever.

Laboratory confirmation should always be obtained, no matter how certain the diagnosis. This is perfectly possible even in a remote village. In hospital practice the following tests are demanded:

1. Blood culture for typhoid organisms in bile broth.
2. Stool and urine culture.
3. The Widal test, which becomes positive in the second week. Later, when a higher titre would be invaluable, chloromycetin treatment may interfere with development of agglutinins.
4. A white blood count, which shows a characteristic leucopenia of 3,000 - 5,000 white blood cells per c. mm.

TREATMENT

The object of treatment is twofold, viz. (*a*) to prevent the spread of infection, and (*b*) curative.

Prevention of the Spread of Infection

Typhoid fever is a disease of filth—faecal and urinary contamination of food or drink. Isolation of a case offers an excellent means of preventing spread, and admission to an infectious diseases hospital is the best isolation. Where a hospital is not available, to set aside a house or even a tent, under supervision, is far preferable to having numerous ignorant family members exposed to the risk, or certainty, of acquiring the disease too. It is possible to obtain the service of an immune nurse who is trained to observe bed-isolation with the use of gowns and disinfection technique, and is able, moreover, to dispose safely of the highly infectious excreta. This last service is so important that it cannot be left to chance. Precise arrangements should be made to deal with the disposal of excreta, and to ensure that all crockery and cooking utensils are sterilized after use. The attendant should not handle food eaten by other people. Flies must be shut out from the sickroom.

Curative Treatment

Where the clinical picture is one of typhoid fever (pyrexia for over a week, headache with apathy, distended abdomen, splenomegaly and leucopenia), specimens should always be sent for laboratory confirmation, but treatment must start immediately without waiting for the results. The institution of treatment during the early bacteraemic stage, before the Peyer's patches have sloughed to form ulcers, makes all the difference between straightforward recovery, on the one hand, and non-recovery or recovery with complications and sequelae, on the other.

Curative treatment augments but does not replace preventive measures. Full treatment must be applied in every single case irrespective of race or station—failure will undermine the safety of every member of the public.

1. *Drug Treatment*

Chloromycetin (chloramphenicol) has revolutionized the outlook in typhoid fever, and it is essential to give it as early as possible. It is taken orally at 8-hourly intervals; but if vomiting interferes with taking it, or excessive diarrhoea with its absorption, it must be given by the intramuscular route (or, if the new soluble preparation proves satisfactory, the intravenous).

The starting dose in an adult depends on the weight—for an average female 0·75 g., for an average male 1 g. 8-hourly. In children, 40-50 mg. per lb. body-weight per day is divided into three 8-hourly doses. This dosage is to be continued until the temperature remains normal. This usually takes 4-7 days. Then the 8-hourly chloromycetin is continued, but in exactly half the previous dosage. The total duration of the course is 14 days, after which the drug is stopped. Lengthening the period of treatment beyond 14 days does not materially reduce the relapse rate, but shortening does increase it.

Salicylate (aspirin) must most specifically be avoided. It causes a sudden drop in temperature accompanied by serious signs of collapse, with sweating, vomiting etc.

Chloromycetin has reduced the mortality rate of typhoid fever from about 10% to well under 1%, and the amount of suffering correspondingly. Nevertheless the treatment time in bed remains much the same as before, and a very real danger arises from the fact that a patient with a bowel full of ulcers may feel relatively well.

2. *Rest*

In order to get the perfect rest which materially influences not only the patient's comfort, but his recovery too, good nursing remains of prime importance. This means absolute rest, during which the patient must be fed and washed and have his every need attended to. Special attention is paid to oral hygiene and the prevention of bedsores. Any movement of the patient must be minimal and gentle (never sit him upright or allow him out of bed), particularly after the second week, when the ulcers of the small bowel are deep, necrotic and ripe to bleed or perforate. It can be understood how movement of a patient by ambulance for any distance under these conditions is attended with the greatest danger, and should be avoided at all costs.

The temperatures and pulse should be taken 4-hourly; this chart often supplies the first indication of a perforation or haemorrhage of the bowel. A fluid intake/output chart is also valuable in indicating the myocardial integrity, kidney filtration, etc.

A typhoid patient needs constant watching by a competent nurse. Any complaint of abdominal pain or vomiting, a sudden drop in temperature or rise in pulse-rate, and the presence of blood in the stool, need immediate reporting. A rise in temperature above 104°F calls for tepid sponging in order to avoid hyperpyrexia.

3. *Diet*

The old starvation diet, with its attendant wastage, debility and deficiencies, has given way to the rational modern treatment in which adequate, non-residue feeding is given. For the first few days the diet consists mainly of milk fortified with glucose. This is given at 2-hourly intervals during the day (not at night), and should not exceed 8 oz. per feed for an adult, 4 oz. for a child. The milk may be flavoured and fortified with cocoa, ovaltine or other preparations. A glass of fresh orange juice should be given daily, or maintenance vitamin C.

Strained porridge or soup can be added, and jelly, custard, and cream are allowed, together with plain chocolate, glucose sweets and butterscotch to give the necessary dietary requirements. After a few days, plain biscuits (Marie), bread and butter (no crusts), soft-boiled or poached eggs may be added. Additional foods such as minced chicken or fish, mashed potatoes or pumpkin, farinaceous puddings and 'pureed' fruit are added quite soon, until the patient has virtually a full diet and only foods leaving bulky residues are avoided, e.g. tomatoes, cabbage etc.

A sufficient calorie and fluid intake is important. Dehydration may necessitate the giving of fluid by intravenous drip. Debilitated patients need protein in concentrated form.

THE COURSE OF THE DISEASE

In the uncomplicated case, the temperature becomes normal and the patient feels much better in 4-7 days. This neither means that the drug treatment can be stopped, nor that the absolute rest can be relaxed. The bowel remains full of ulcers. Bed rest for 3 weeks must be enforced, often against a patient's wishes, and only then are more pillows allowed, together with the movement in bed. By the middle of the 5th week from the commencement of treatment the patient is allowed to be out of bed, and he goes home at the end of the week provided he is free from typhoid organisms.

Complications

Toxaemia may be severe fairly early in the bacteraemic state, and is the commonest cause of death, through myocardial failure, which is evidenced by prostration, a gallop-rhythm, bradycardia and ECG changes. Although cortisone is rationally dangerous to a patient with an ulcerated bowel, and should never be used lightly, there are exceptional cases in which death from toxaemia would appear imminent, and in these cortisoneh as at times been life-saving. We repeat, cortisone has no place in the routine treatment of typhoid fever. The later development of the 'typhoid state' of the text-books has largely been abolished by chloromycetin.

Perforation of the bowel, as already stated, is often precipitated by movement. The symptoms are abdominal pain, sometimes vomiting and collapse. The signs are a rise of pulse rate with a drop in temperature, abdominal tenderness and increasing rigidity, absence of bowel sounds and disappearance of liver dullness. It is confirmed by the finding of air under the diaphragm on an X-ray plate taken in the erect position. Conservative treatment has totally superseded operation, and a death is now very exceptional. Treat by placing the patient in the Fowler's position,* start continuous gastric suction, and give all fluids intravenously and all treatment parenterally. In addition to intramuscular chloromycetin, also give streptomycin and penicillin similarly. This regimen is continued until bowel sounds return, when ordinary treatment can be resumed. In a few cases a pelvic abscess forms, and this may have to be surgically drained well on in the convalescent stage—when the patient is fit to stand it.

Bowel haemorrhage is a catastrophe often resulting from injudicious transporting of a patient. The diagnosis can often be made before the passage of tarry melaenic stools or bright red blood in the stool. There is no abdominal tenderness or rigidity, the bowel sounds are present—sometimes even increased—and the liver dullness is normal. An immediate blood transfusion may be necessitated by the severe loss of blood. Where the bleeding is not so severe, it may be wise to wait till it has stopped, and then to transfuse if necessary. All solid foods per mouth are entirely withheld, and only fluids given.

Relapse is far less common since chloromycetin treatment has become standard, but does still occur. The usual time is in the 4th or even 5th week, when the patient is almost ready to leave hospital. The temperature rises and all symptoms and signs of the disease return, often in less pronounced form. Chloromycetin treatment is luckily as effective as in the original attack, and a full course must be repeated.

Meteorism, or extreme abdominal distension, is not only distressing, but embarrasses both pulmonary and heart functions. It is useful treatment to citrate the milk feeds.

Diarrhoea, when excessive (say more than 10 stools per day), may prevent the absorption of chloromycetin, which should then be given by intramuscular injection. Intravenous feeding may be required.

Pneumonia. Lobar pneumonia occasionally occurs and responds well to chloromycetin.

Cholecystitis. Pain and tenderness in the right hypochondrium is common in typhoid fever. It has to be

* The head of the bed raised 18 or 20 inches.

distinguished from a perforation. The tenderness is localized over the gall-bladder, and liver dullness persists.

Femoral thrombosis is very rare if gentle leg movements are carried out daily.

Peripheral neuritis used to be common, probably as a result of dietary deficiency. With increased feeding it is never seen today.

Septic parotitis is preventable and is an indication of poor oral hygiene.

Post-typhoid psychosis is of toxic origin. It is rare and responds to shock therapy.

Other complications such as meningitis, osteitis and typhoid abscesses are very rare.

RELEASE FROM ISOLATION

After the initial diagnostically important stool culture for typhoid bacilli, it is pointless to have further bacteriological examinations made until after treatment is completed. Then it becomes imperative once more to know whether organisms continue to be excreted in the faeces and urine; that is to say, whether the patient has become a carrier. At the end of the 3rd week blood is taken for the Vi agglutination test, and specimens of faeces and urine are sent to the laboratory at intervals of 5 days. If the Vi test is negative, and no typhoid bacilli are found in 3 specimens of faeces and urine, the patient can be released from hospital or isolation at the end of the 5th week.

Carriers. If the Vi test proves to be positive, or if the stool or urine is found to contain typhoid organisms, the patient needs more extensive investigation to determine whether he is a carrier. It is good practice to submit 10 stools at intervals of 5 days; all must prove negative if the patient is to be released from hospital. If any are positive, then the patient is a carrier, and further efforts should be made to rid him of organisms. Chloromycetin has often proved ineffective in eradicating the organisms in the urinary or faecal carrier state, but it should be given a good trial—say 3 courses with an interval between. Achromycin should also be given a trial before surgical measures are invoked, as they are in some cases. All these may prove ineffective and the resulting permanent carrier is a health hazard needing continuous control.

VACCINATION AGAINST TYPHOID FEVER

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Vaccination against typhoid fever was first introduced at the end of last century and this prophylactic method has since been extensively employed in armed forces throughout the world. From experience in these forces it was soon claimed that this vaccine was very effective in reducing the incidence of typhoid fever and very convincing figures were published in support of this contention.

Doubts

During the period between the world wars, however, doubts began to arise about the true efficacy of this vaccine, for it was found that attacks of typhoid fever were by no manner of means as uncommon in persons who apparently were adequately inoculated as was generally supposed, particularly when they were exposed to heavy risks of infection. It was then suggested that much of the apparent success of the vaccine in reducing typhoid fever in armies could be attributed to other improvements in hygiene, e.g. the chlorination of water supplies, which was introduced at about the same time as routine vaccination against typhoid.

The discovery of the Vi antigen, and the supposedly important role it played in protection as evidenced by animal experimental studies, led to efforts to improve the vaccine; and the alcoholized form of the vaccine, which is prepared from carefully selected, smooth, fully virulent strains of *S. typhi* in which the Vi antigens are effectively preserved with alcohol, was introduced. This latter vaccine, in certain countries, began slowly to replace the older (phenolized) type of vaccine, which was thought to be deficient in the important Vi antigen.

After the second world war still further doubts, as a result of experience in prisoner-of-war camps in North Africa, began to be thrown on the efficacy of typhoid vaccine. Typhoid fever was prevalent in some of these camps where there was gross overcrowding and poor hygienic conditions, and evidence was obtained from some of them, where the risk of typhoid fever was high, which indicated that the vaccine was only of value in reducing mortality and not in reducing morbidity. There is, however, sound evidence from other recent sources to show that typhoid vaccine may be of definite though limited value in reducing the incidence of the disease. Thus, in 1943, a study of a group of men exposed to infection from a common contaminated water supply showed that the incidence of typhoid fever in the inoculated persons was only 1·1% as compared with 7·0% amongst the uninoculated.

On the whole it would thus appear that typhoid vaccine is of definite but limited value in that it may reduce both the incidence of typhoid fever and its mortality, but that the immunity it confers is only relative and will not withstand heavy assaults. The immunity would also appear to fade gradually, and hence the desirability of repeated booster doses at intervals of one to several years.

WHO Yugoslavia Report

Recently the preliminary report of the World Health Organization on the strictly controlled field trials held in Yugoslavia on the value of typhoid vaccine has thrown some very valuable light on this difficult problem. About 48,000 subjects took part in these trials, which were carried out over the period 1954-56 in a district in which typhoid fever was endemic at the time. The subjects were divided at random into 3 comparable groups subjected to the same risks. One group was immunized with phenolized vaccine, another with alcoholized vaccine, and the third was given a control Flexner vaccine. The results of the trials were somewhat surprising. They indicated that, under the conditions of the trials and with the particular vaccines employed, the phenolized vaccine gave a 70% protection rate, whereas the alcoholized vaccine appeared to be no better than the

control Flexner vaccine, which theoretically should have given no protection to typhoid. This was despite the fact that the alcoholized vaccine on the whole gave a better Vi antibody response than the carbolized, thus suggesting that the inclusion of Vi antigen in the vaccine is not as important in man as suggested by animal experiments. The trials also showed that existing laboratory tests could not be correlated with the protection given by the vaccine in man, which indicates that at present we appear to have no accurate laboratory test for assessing the protective potency of typhoid vaccine for human use.

The important inference to be drawn from these trials is that the older carbolized vaccine appears to be of definite but limited protective value and the newer alcoholized vaccine of poor and doubtful value.

South African Endotoxoid Vaccine

What about the endotoxoid vaccine as prepared by the South African Institute for Medical Research and generally used in South Africa? This vaccine is prepared in a different manner to the carbolized or the alcoholized vaccines and, therefore, it is a different type of vaccine. It is prepared from carefully selected strains of bacteria, which are broken up by repeated freezing and thawing to liberate the endotoxoids, which are then detoxified by treatment with formalin.

The protective value of endotoxoid vaccine, the use of which appears to be exclusive to South Africa, has not been assessed by controlled field trials similar to those recently held in Yugoslavia. Available knowledge, however, including in particular the experience gained in the use of this vaccine in South African troops during World War II, indicates that this vaccine is at least as effective as the TAB vaccines then in use in the British and American armies.

Other Considerations

A minor disadvantage of typhoid vaccine, which occasionally may cause a little concern, is the fact that repeated doses may induce a hypersensitivity state to the typhoid antigens in certain subjects.

Another point to be considered is the possible provoking effect of typhoid vaccine when given to subjects who are incubating the disease. There appears to be definite evidence that, when given under such circumstances, the vaccine, presumably by inducing a negative phase, may have a harmful action on the subject. This means that due care should be exercised when vaccinating in the face of an epidemic.

It has been shown that typhoid patients who have been successfully treated with chloramphenicol may fail to show a significant rise in the specific antibody titres. This indicates that a satisfactory immunity may not be acquired in patients in whom the disease has been aborted by chemotherapy. The practice has, therefore, arisen of giving such patients, as soon as they have sufficiently recovered from the disease, a course of vaccine inoculations. This, theoretically, would appear to be a wise procedure which may be of some value in preventing the patient from suffering a later reinfection.

CONCLUSIONS

From this summary of our present knowledge, it is obvious that typhoid vaccine should be used with discretion. Used under the proper circumstances, a potent vaccine is no doubt a very useful prophylactic agent but one of limited value. Its role in controlling typhoid fever should, therefore, be but a secondary one. The important measures to be taken for the public-health control of typhoid fever are the institution of proper community hygiene and the tracing of carriers. It is through these two basic measures and not through vaccination that typhoid fever has been virtually eliminated during the last half century in certain fortunate countries and it is on these measures that we must rely in South Africa. Vaccination is no doubt of importance in the armed forces and in certain selected portions of the population at special risk, e.g. in nursing and health staff and possibly in Natives in reserves as a temporary emergency when there are great difficulties in instituting proper hygienic measures. It may also be useful in other general emergency conditions, as in times of national disaster, e.g. floods. It is, however, doubtful whether general vaccination campaigns against typhoid fever in the civilian population do much good and, if such campaigns are instituted, they must never be allowed to give rise to a false sense of security and to cloud the issue by interfering with the adequate carrying out of the basic campaign of instituting proper hygenic measures and searching for carriers.

Official permission has been obtained from the Secretary for Health to publish this paper.

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EDITORIAL : VAN DIE REDAKSIE

TYPHOID : THE OUTLOOK IN SOUTH AFRICA

Typhoid fever assumed very large proportions in the Western world during the nineteenth century. Until after 1830 it was not recognized as a different disease from typhus and relapsing fever, and it was not until 1869 that typhoid fever was separately recorded in the death returns for England and Wales. In 1881 the causal bacillus of typhoid was isolated, but before that time epidemiologists had established that cholera and typhoid were spread by the drinking of contaminated water from wells and rivers, and had recognized the part played by pollution with excremental discharges. From 1867 onwards numerous outbreaks of water-borne typhoid were reported on by Government inspectors in England. Great importance, also, in the causation of zymotic diseases was attributed to the pollution of the air by emanations from excremental and other accumulations.

As a result of the sanitary reform movement of the mid-nineteenth century, based on these views, works were constructed in towns to provide wholesome piped water supplies and water-carriage systems of sewerage so as to make it possible to abolish the foul and insanitary latrines which had hitherto been in use. The spread of these sanitary works through England and Wales was associated with a steady decline in the incidence of typhoid. In the first quinquennium (1871-75) after the disease was registered the annual typhoid death rate was 39 per 100,000 population. In 25 years (to the turn of the century) the rate fell by about 50 per cent, in 50 years (to 1921-25) by 96 per cent, and in 74 years (1945-49) by 99·6 per cent. The decline has continued still further since 1950, especially the *S. typhosus* infection; the majority of enteric cases in Britain now are the result of *S. paratyphosus* infection.

During the half-century 1871-75 to 1921-25, the 96 per cent reduction can be ascribed mainly to improved sanitation. Amongst the other factors that contributed to the result during the latter part of the period may be counted the control of sewage-polluted shellfish, the reduction in fly prevalence, and the hospital isolation of typhoid patients, which enabled some bacteriological control to be exercised over the discharge of patients from isolation. Certainly there was no generalized searching out of carriers, and, in the civilian population, no general use of anti-typhoid vaccine, nor had the antibiotic treatment of typhoid cases been introduced at that time. It may safely be concluded that the remarkable decline in the disease that took place in England and Wales during that 50-year period was in the main due to the general provision of pure water supplies and of water-borne sewerage.

Since 1925 the disappearance of typhoid in England has gone on apace, and in more recent years the mortality figures have been reduced by the improved methods of medical treatment that are now available. The control of carriers has become more efficient and is probably playing a greater role than formerly. As the number of cases—and consequently the number of carriers—becomes smaller, so it becomes possible to devote closer attention to the tracing of the source of infection in individual cases and to the control of every carrier who is discovered.

In South Africa typhoid has long been prevalent. Satisfactory long-term statistics for the whole population of the Union are not available, but the annual reports of the medical officer of health of Cape Town contain records for Europeans and non-Europeans since the amalgamation of the municipality in 1913. These show that for the quinquennium 1916-20 the annual Cape Town death rate from typhoid (34 per 100,000 population) was only a little less than the figure for England and Wales when typhoid deaths were first separately recorded (39 per 100,000, 1861-75). At that time (1916-20) the whole municipality of Cape Town was supplied with piped water, but only the central part was provided with water-borne sewerage; the people of the 'southern' and 'northern' suburbs were served with pail closets, which at that period were in the process of being replaced by a sewerage system then under construction. The population of the municipality was about equally divided between Europeans and non-Europeans. Isolation hospital accommodation was provided for typhoid patients.

In the period of 20 years following the quinquennium 1916-20 the typhoid death rate of the municipality fell by about 90 per cent (to 3 per 100,000 per annum in 1936-40). The most evident reason for this decline is found in the water-borne sewerage that had been extended to the whole municipality. Virtually nothing had been done in the way of discovering and controlling typhoid carriers, or the use of anti-typhoid vaccine. Fly prevalence had been reduced. In the investigation of typhoid cases no reason at all had been discovered for suspecting shellfish as a source and, except for a few milk-borne outbreaks, milk supplies did not fall under suspicion to any great extent. Very few cases of paratyphoid fever were discovered.

For 10 years more (1941-51) the typhoid death rate varied about the same level (3 per 100,000), but in subsequent years it has fallen to less than 1 per 100,000 (in 1957 only one typhoid death occurred), probably largely as the result of the antibiotic treatment of patients. (The annual incidence, or notification, rate of typhoid *cases* for 1951-55 was 18 per 100,000 population.) During these last few years an increasing amount of attention has been paid to the discovery and control of typhoid carriers. In the City Hospital for Infectious Diseases every typhoid patient is detained until, if this can be achieved, he is no longer excreting *S. typhosus*. It is hoped that the use of chloramphenicol in the treatment of cases will lead to a reduction in the number of carriers developing, which will tend still further to stay the spread of the disease.

Thus experience in Cape Town, like that of many other cities and countries, emphasizes that (besides a pure water supply) the primary requisite for the prevention of typhoid

fever is the provision of water-carriage sewerage for human excremental refuse.

Outside the larger cities and a few of the smaller towns water-carriage sewerage is not generally available in South Africa, and water supplies are of varying degree of purity or pollution. In most smaller towns and villages pail closets are in use, with resulting nuisance and danger to health, and this applies to many peri-urban and rural areas. Like the larger cities, the population in the pail-closet areas comprises Bantu and other non-Whites as well as Europeans. In some regions there are few privies at all and the bush is used for urination and defaecation. No complete statistical expression is available of the degree of typhoid infection which exists in these insanitary regions, but local epidemics are often reported and there is known to be a high typhoid endemicity in many places in the Union. In many of these areas, also, no hospital is available for the reception of cases of the disease.

It is evident that the problem of typhoid in towns that are provided with good water supplies and water-carriage sewerage is to be approached from a very different point of view from towns and villages that lack these sanitary essentials. The sewered towns of South Africa are in much the same favourable position as the rest of the Western world with, however, the important difference that, unlike English towns, for example, they have a kind of 'hinterland' of typhoid infection. So long as uncontrolled migration is taking place into a city from parts of the country, near or far, where typhoid is endemic, especially of non-European servants and labourers, typhoid carriers will be introduced into the city. This will tend to counteract the reduction in the number of carriers that naturally follows the local prevention of typhoid; and it will stand in the way of the virtual extinction of typhoid fever that is taking place in some countries.

The articles on typhoid fever that are published in this issue of the *Journal* should bring readers up to date on certain aspects of the problem. They are not only of interest to medical practitioners, but they indicate some of the essential factors that concern the health authorities—local, provincial and central. It is the private practitioner who is normally the first to recognize the case of typhoid fever, and his help is needed by the authorities in tracing the source of infection, uncovering carriers, and controlling cases, carriers and contacts. The Union Health Department places facilities for bacteriological diagnosis at the disposal of practitioners in all parts of the Union. In view of the great importance of early antibiotic treatment doctors are urged to send blood for examination at the earliest moment in all suspicious cases, if possible during the first week. The Widal test, so much used in the past, is not today considered to be of value in early diagnosis.

It is important that municipal health departments should intensify the search for carriers and their relation to outbreaks of the disease, and should organize effective supervision of carriers and their exclusion from acting as food handlers. Equally important, perhaps, is the isolation of typhoid cases and their screening before discharge with a view to preventing the premature liberation of carriers. It is also the function of these departments to organize the protection of food and drink from excremental contamination and the consequent risk of typhoid infection. Important under this heading are the production and distribution of milk and milk products; the processing, preparation and serving of foodstuffs, especially those that are eaten cold; and fly control.

These preventive measures are even more urgently required in unsewered towns and villages, in places where the water supply is dangerous or suspect, and where no satisfactory provision is made for the isolation of typhoid cases. Yet in unsewered towns the importance of these measures is secondary to the need for water-carriage sewerage, and similar considerations apply to a safe water supply and isolation accommodation. Moreover, in the places where these fundamental requirements are lacking, skilled health officials are also lacking. Where, however, a medical officer of health is available, the doctors in private practice and other enlightened residents should afford him the benefit of their cooperation and support, and should continually impress upon their fellow citizens and the health authority—local, provincial or central—the danger from the insanitary conditions and the possibility of reform.

DIE BETEKENIS VAN GESONDHEIDSMAATREËLS

Een van die mees interessante en treffende hoofstukke in die geskiedenis van siektebestryding in die algemeen, is die opkoms van die beweging in gemeenskappe dwarsoor die wêreld van die doeltreffende toepassing van gesondheidsmaatreëls. Tesame met die ryping van ons insig in die implikasies van die voorkomende medisyne het hierdie aspek van die sosiale medisyne—die herorganisasie van die patrone van gemeenskapslewe op die basis van bekende gesondheidsmaatreëls—'n groot bydrae gemaak tot ons veranderde insig in die globale siektebeeld as sodanig. Siekte het nie meer net 'n besoeking gebly wat aanvaar moet word en met mediese middels behandel moet word nie; dit het ook 'n uitdaging geword wat op die basis van gemeenskapsbeplanning onder beheer gehou kan word.

Die geskiedenis van die voorkoms en bestryding van ingewandskoors oor die afgelope honderd jaar is in hierdie verband 'n treffende voorbeeld. Soos ons in die voorgaande artikel aantoon, het die voorkoms van maagkoors in van die ouere Westerse lande en ook in Suid-Afrika met meer as 99 persent gedaal—maar dit het plaasgevind hoofsaaklik in gebiede waar bevredigende beheer uitgeoefen word oor watervoorsiening, waar 'n stelsel van water-rioelering bestaan en waar daar fasiliteite is vir die afsondering van besmetlike gevalle en vir die beheer van voedselhantering in al sy aspekte.

Op grond van die ondervinding in sommige van die Westerse lande wil dit lyk of dit moontlik mag word om maagkoors heeltemal onder beheer te bring op die grond van volgehoue en doeltreffende gesondheidsmaatreëls van die soort wat ons hierbo genoem het. En beheer oor die siekte en die voorkoming van nuwe gevalle moet sonder twyfel 'n goeie uitwerking hê op die sekondêre en moeilik hanteerbare probleem van die gesonde draers van die maagkoorskiem. Want hoe minder nuwe gevalle voorkom, hoe minder draers sal daar wees.

Ons noem die oorwegings net weer hier om 'n perspek-

tiewe blik te kan werp op ons eie toestande in Suid-Afrika en op die spesiale vorm en omvang van die uitdaging waarvoor ons in hierdie land staan.

Omrede van die uitgestrekte gebiede van ons land en ook as gevolg van sommige van ons arbeidsreëlings bly ons blootgestel aan invalle uit besmette en onbeheerde focusgebiede—'n toestand wat nie net die positiewe uitwerking van bestaande gesondheidsmaatreëls omver werp nie, maar wat ook die reeds moeilike probleem van die draer kunsmatig aan die gang hou.

Vir die doeltreffende bekamping van hierdie siekte in ons land en die voorkoming van sporadiese epidemies soos wat van tyd tot tyd in ons grotere stede en elders voorkom, sal ons moet reken op 'n verbeeldingryke en omvattende stelsel van beplanning wat in die eerste instansie sal moet uitgaan van die Departement Uniegesondheid. Ons is dankbaar om te kan sê dat hierdie Departement alreeds alle moontlike fasiliteite op hierdie gebied in werking probeer stel. As 'n mediese professie en as 'n gemeenskap is dit ons plig om die Departement te steun. Daar is egter ook talle plaaslike liggame dwarsoor die land wat dank en aanmoediging verdien.

Ons weet *wat* in 'n groot mate die antwoord op die probleem van ingewandskoors is: goeie watervoorsiening, 'n waterstelsel van rioolering, beheer oor voedselhantering, beheer oor ander verspreidingsmaniere van kieme, soos byvoorbeeld deur vlieë, die hantering van die draertoestand en, laastens, die aktiewe behandeling in hospitale onder toestande van afsondering, van akute gevalle. Hoe om hierdie antwoord as daadsaak te bewerkstellig in ons land met sy menigvuldigheid van probleme en toestande, is die uitdaging, maar ook die geleentheid, wat die toekoms aan ons stel.

THE ROLE OF THE LABORATORY IN THE DIAGNOSIS AND CONTROL OF TYPHOID FEVER

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Typhoid fever is a serious infectious disease which is widely endemic in the rural areas of the Union of South Africa and which occasionally spreads into the urban areas. It is a preventable disease.

As the disease and its carrier state, which is responsible for its persistence in a community, can only be diagnosed with certainty by laboratory tests, an adequate public-health laboratory service must be an essential feature of any practical programme for its control. The Union Health Department provides such a service.

LABORATORY SERVICES PROVIDED

Pursuant to Government Notice No. 1073 of 22 June 1956, a pathological laboratory service is provided, free of charge, by the Union Health Department to medical practitioners, and to local authorities which have established services under the Public Health Act 1919 for the control of infectious diseases, for the performance of such laboratory tests as may be reasonably required for the diagnosis and control of certain scheduled infectious diseases. Amongst these scheduled diseases is enteric fever, i.e. typhoid and paratyphoid fevers. This service, as provided for medical practitioners, is restricted to tests necessary to confirm the presumptive clinical diagnosis in patients who are suspected to be suffering from these scheduled diseases. For local authorities, however, the service provided is of much wider scope and includes not only tests required for the diagnosis of these diseases but also those required for the treatment of patients 'for ascertaining when such patients have become free of infection, (and) for the public-health control of such diseases, including the detection of human carriers . . . and the tracing of outbreaks . . . to their sources with the object of preventing further spread'.

These services are at present provided either directly by the Union Health Department through its own laboratories at Cape Town and Durban, or indirectly on its behalf by other organizations, e.g. by the South African Institute for Medical Research, Johannesburg, and its various branch laboratories in other centres, and by the laboratory of the Cape Provincial Administration at East London.

The typhoid bacterium is a relatively hardy organism which readily survives in specimens sent through the post even though several days may elapse before they are delivered to the laboratory. There are, therefore, few areas in the Union which are so distant from the nearest laboratory that they cannot be effectively served with tests for enteric fever infections. It is unfortunate from a public-health point of view that so many medical practitioners and local health authorities fail to make full use of these free services provided by the Union Health Department. There is really no sound excuse for this and, by ignoring these services, medical practitioners and local authorities hinder public-health efforts for the control of this unnecessary disease and so render the country a disservice.

LABORATORY TESTS FOR THE DIAGNOSIS OF TYPHOID FEVER

Typhoid fever results from an alimentary infection with *Salmonella typhi* which rapidly develops into a generalized condition characterized by septicaemia. Very soon, however, the infection becomes largely localized to the mesenteric lymph nodes and the Peyer's patches of the small intestine. Both of these tissues undergo inflammatory hyperplastic changes and, towards the end of the 2nd week, necrotic changes occur in the Peyer's patches and lead to bowel ulceration. Gradually, also, antibodies are produced against the invading organism and, during the natural course of the disease, may lead to clinical recovery of the patient, which normally is expected to commence about the 4th week unless shortened by antibiotic therapy.

Because the disease commences as a septicaemia, blood cultures during the 1st week are positive in virtually 100% of cases. Thereafter the percentage of positive blood cultures diminishes so that during the 3rd week of the disease they are usually negative.

Though stool cultures may be positive during the 1st week, it is not until the 2nd week, when ulceration may begin

in the bowel, that the organisms are excreted in such numbers that they may be readily recovered by stool culture in almost all cases. This abundant intestinal excretion of *S. typhi* continues until convalescence when, in the majority of cases, it gradually ceases. The minority become chronic carriers and continue to excrete the organisms indefinitely though outwardly they may have completely recovered from the effects of the disease.

Typhoid bacteria may also be excreted in the urine during the 2nd and 3rd weeks of the disease and occasionally this urinary excretion may persist until long after convalescence has passed. These latter cases constitute the chronic urinary carriers.

The rise in antibody titre does not reach significant levels until well into the 2nd week of illness. The rise is chiefly in the H and O agglutinins; the Vi agglutinins usually only appear in low titre during the 3rd week and then soon disappear except in cases in which a chronic focus of infection persists.

The early presumptive clinical diagnosis of typhoid fever during the 1st week—the most important time to make the diagnosis—is therefore best confirmed by blood culture and thereafter by stool culture. Because of its insidious onset, it may be difficult to decide clinically whether the disease is in its 1st or 2nd week. For this reason it is recommended that, when typhoid fever is first suspected, both specimens of blood and of faeces should be sent to the nearest laboratory for diagnostic tests.

The typhoid organism is not fastidious in its growth requirements, so that a simple broth may be used for blood culture. The addition of bile salts in small quantities to the medium does not interfere with the growth of enteric organisms, though it will inhibit the growth of most organisms likely to contaminate a specimen of blood during its collection. The medium of choice for the isolation of *S. typhi* from the blood is, therefore, bile broth. Because antibacterial substances may be present in the plasma, it is wise to dilute the blood specimen with such quantities of medium as to render these substances inactive. Not more than 5 ml. of blood, therefore, should be added to 100 ml. quantities of medium. Suitable culture bottles containing adequate quantities of medium for the diagnosis of typhoid fever by blood culture may be obtained by medical practitioners and local authorities in reasonable quantities to meet their requirements on request to the laboratory which serves their area.

Specimens for blood culture should be collected by venipuncture with the usual aseptic precautions and the inoculated bottles should then be forwarded to the laboratory with the minimum of delay.

For stool cultures fresh specimens of stool should be collected, in quantities of about a teaspoonful, in containers with airtight screw-cap stoppers, such as are supplied by the laboratories for this purpose. In order to avoid drying of the specimen if it is to be sent a long distance by post, it may be desirable to preserve it either in Sach's solution or in selenite broth, but usually this is quite unnecessary. Specimen bottles containing these solutions may be obtained from the laboratories on special request.

It is most important that specimens of blood and stools for cultural investigations should be collected before any antibiotic therapy is commenced.

Once collected, the specimens should be forwarded to the laboratory with a minimum of delay. Cultural tests for *S. typhi* on blood and stools are usually completed within 72 hours of the receipt of the specimens at the laboratory, but results of examinations are sometimes delayed for a week or so because of such causes as the tardy growth of the organisms. It is the usual practice of laboratories promptly to notify the positive result of any cultural test for the diagnosis of typhoid fever by telephone or telegram to the medical practitioner who forwarded the specimen. All reports are then confirmed in writing.

Widal tests have been employed extensively in the past for the diagnosis of typhoid fever but today they may be considered to be of no real value for this purpose. For the effective treatment of typhoid fever with chloramphenicol, early diagnosis is of paramount importance, since the earlier such treatment is commenced after diagnosis the quicker is the cure and the less the chance of a chronic carrier state developing. A diagnostically significant titre of H and O agglutinins in the serum of the patient is normally not to be expected before the end of the 2nd week of the disease, which is too late. Difficulties also often arise in the interpretation of the results of this test. Thus, the quantitative immunity response of individual persons varies greatly, so that it is difficult to decide what is the lowest agglutinin level that should be regarded as diagnostically significant. This position is further complicated by the fact that persons who have received previous TAB vaccine inoculations may show a non-specific anamnestic rise of the typhoid agglutinins to any febrile disturbance, so that further tests, causing more delay, may be necessary to decide whether the titre is a rising one and so of diagnostic importance. Now that blood and stool cultural tests give such excellent results during the earlier stages of the disease, Widal tests may be regarded as more of historical interest than of practical value, except in recovered cases in which it may be desirable to make a diagnosis in retrospect. The Vi agglutinins, which are more tardy in their development than the H and O, also rise too late to be of any help in the early diagnosis of the active disease.

TESTS TO ASCERTAIN WHETHER THE PATIENT IS FREE OF INFECTION

All cases of typhoid fever excrete typhoid bacteria in their stools and many cases also excrete them in the urine. This excretion usually only continues until convalescence but, in a few cases, it may persist indefinitely despite the patient's apparent full clinical recovery from the disease and despite adequate chloramphenicol therapy. Such patients become 'healthy' carriers. The fact that the subject has made a full clinical recovery from the disease is thus no evidence whatever that he is not a carrier and still excreting the pathogens. Such carriers are a definite danger to others because they are capable of transmitting the disease to them. This carrier state can only be diagnosed by laboratory means. It is therefore most essential in the public-health interest that no patient who has clinically recovered from typhoid fever should be regarded as free of infection and fit for discharge from medical surveillance until it has been proved, by adequate bacteriological tests, that he is no longer excreting the organisms in his stools or urine.

As all typhoid patients continue to excrete the organisms until well into the convalescent stage, it may be regarded as

a waste of effort to submit specimens for testing for freedom from infection until 3-4 weeks have elapsed since the commencement of chloramphenicol treatment. Thereafter, at least 3 specimens each of stool and urine should be sent to the laboratory at intervals of not less than 4 days for cultural testing. Some authorities also think it wise at the end of this period to send a sample of whole blood or serum for a Vi test to confirm that no focus of infection is persisting. If all these specimens of stool and urine prove negative and the Vi agglutinin titre is less than 1 in 10, the subject may be regarded as free of infection and fit for discharge from medical surveillance. If, however, any one of these tests prove positive, he should be regarded as a potential chronic carrier. In such a case a further series of not less than 6 specimens each of stool and of urine should be sent for testing at similar intervals and the Vi test should again be repeated at the end of this series. If all these specimens prove to be negative and the Vi agglutinin titre below 1 in 10, the subject may now be regarded as free of infection, but if any of these specimens for cultural test prove positive and, possibly, if the Vi agglutinin titre remains unduly high, the subject should be regarded as a carrier and a potential danger to others. He should therefore be kept under surveillance by the local health authority and should not be allowed to carry on any work associated with the handling of food, and all necessary hygienic instructions should be given to him to minimize the possibility of his infecting others. The pathologist in charge of the laboratory should be consulted on what further tests should be carried out, and when, so as to determine whether there is any change in the carrier state of the subject and whether he is responding to any treatment that may have been prescribed. It is unfortunate that in these cases further treatment with antibiotics is seldom of any value and that the problem of how best to cure the chronic carrier has still found no really satisfactory solution. Nevertheless, by keeping known carriers under proper medical surveillance a great deal may be done by health authorities in preventing them from spreading the disease to others.

Experience at Cape Town shows that, if the diagnosis of typhoid fever is made in the early stages of the disease and adequate chloramphenicol treatment is immediately instituted, the chronic carrier rate is kept low—in the neighbourhood of 2% for faecal carriers and less than 1% for urinary carriers.

LABORATORY TESTS FOR THE DISCOVERY OF CHRONIC CARRIERS

The only natural reservoir for typhoid bacteria is the human being, i.e. the patient suffering from or recovering from the disease and the 'healthy' chronic carrier. Both patients and chronic carriers excrete typhoid organisms in their faeces or urine and the spread of disease from them to others is usually by excremental contamination of water or foodstuffs, including milk.

As patients suffering from acute typhoid present the typical clinical picture of the disease, the diagnosis of which may be confirmed with certainty by appropriate laboratory tests, and as by such tests it may also be determined with reasonable certainty when they become free of infection and so incapable of spreading the disease to others, the spread of disease from such patients may be readily controlled by simple public-health measures. Far more difficult, however, is the control of the spread of the disease from the unknown healthy carrier. These carriers present no clinical signs and may not even have a history of typhoid fever, since they may possibly have acquired the carrier state from a subclinical infection. They may, therefore, long remain unsuspected in a community and perhaps give rise to repeated epidemics. Until these carriers are detected they remain a potential and unknown source of danger. The hygienic measures that are necessary to completely obviate the danger of acquiring a typhoid infection are difficult to practise effectively in rural areas, particularly amongst primitive non-European communities. Moreover, typhoid infection when present in one community may readily cross to another, and vaccination confers only a relative and not very lasting degree of immunity. For these reasons, one of the most important factors in the attempted control of typhoid fever in South Africa should be well directed efforts towards the tracing of carriers. To attempt, even in a small community, to test and, possibly, periodically retest everybody to ascertain whether any carriers exist in it is obviously quite an impracticable procedure. When, however, a case of typhoid fever, which may herald an epidemic, occurs in a community, besides tightening up local hygienic measures, effectively controlling the patient, and perhaps initiating a vaccination campaign, every effort should be made by the local health authorities to trace the source of the infection back to the original carrier. This is obviously often a very difficult task involving much hard and persistent effort, which must be intelligently directed. Unfortunately there are no reliable short cuts and, until the unknown carrier is detected, there is always the danger that he may start fresh epidemics.

To help trace chronic carriers, the Vi agglutination test has been extensively used in South Africa. Theoretically these tests depend upon the assumption that the active focus of infection which may persist in the subject and render him a carrier is associated with a persistent rise of Vi agglutinins in his blood. These agglutinins may be demonstrated by a relatively simple inexpensive serological test. The Vi agglutination test should therefore be a very valuable screening test for tracing potential carriers. Our practical experience, however, is that this test is a disappointing one. Firstly there are various technical difficulties. The antigen, which is the essential reagent used in the test, is often unreliable as evidenced by the fact that antigens obtained from different and presumably reliable sources, when tested in parallel against unknown sera, often give widely differing results despite the fact that they have supposedly been standardized. There is also the difficulty in deciding what is a diagnostically significant titre. Generally a titre of 1 in 10 with a standardized antigen is regarded as suggestive of the carrier state, but there is evidence that proved carriers may on occasion show a lower titre than this—even none at all. A further difficulty is the fact that so many persons who show a titre of Vi agglutinins of 1 in 10 or more are obviously not carriers in that there is no epidemiological evidence to implicate them with any typhoid cases and, more important, in that despite extensive bacteriological investigations there is no evidence to indicate that they ever excreted typhoid bacteria. Finally, and most serious, is the frequent misapplication in South Africa of this test by local health authorities. Some of them require all food handlers to be periodically subjected to Vi tests, and those who are found to give positive tests are then immediately, and often without any further investigation, taken off their jobs. So

ridiculous has been the position that I have even known persons who were employed as 'food handlers' in handling hermetically sealed metal cans of food in a store to be dismissed from their jobs because they gave Vi-positive tests. A Vi-positive test by no manner of means proves that a person is a carrier of typhoid fever. Even provided that the positive result is a reliable one, it at best merely suggests that the person may be a carrier; and the only way to prove that he is in fact a carrier is by bacteriological cultural tests to prove that he is actually excreting the organisms. For a person to be dismissed from his employment as a food handler merely because he unfortunately gives a Vi-positive test appears to be both unwarranted and unfair. If a Vi-positive test is to be regarded as suggestive evidence that a food handler may be a typhoid carrier, the proper procedure is to suspend him temporarily from the handling of food and then to investigate the position by appropriate bacteriological tests to ascertain whether he is actually excreting typhoid bacteria.

I personally think that the Vi test, as at present generally used in South Africa, is sometimes so unreliable in its results and so often misused in practice that it should be dropped from routine usage until the technique for its performance has been suitably improved, particularly in respect to the provision of reliable antigens, and its value in detecting carriers more effectively assessed by a properly carried out research programme.

There would thus appear to be only one reliable way for tracing the carrier who has initiated a typhoid epidemic, and that is the hard way. The first step is 'police' epidemiological investigations by health officials to trace all possible suspects, and the second step is to find which one of these is guilty by the performance of appropriate bacteriological tests on properly collected urinary and faecal specimens.

Urinary carriers are readily proved by cultural tests on samples of urine which need not be catheter specimens. The collection of suitable faecal specimens is more difficult. The evidence is that in the faecal carrier the focus of persistent infection is usually in the gall-bladder or biliary passages, and that the excretion of the bacteria may be intermittent and their numbers in the faeces so low that they may readily be missed on routine cultural examinations. It has, therefore, been suggested that the best way to detect 'faecal' carriers is to culture samples of duodenal fluid obtained by the passage of a duodenal tube. This minor operative procedure, however, is very cumbersome and not suited for routine usage in the tracing of carriers. My personal experience is that very good results may be obtained by giving the subject a small dose of calomel followed by magnesium sulphate and then culturing a specimen from the third stool obtained by this artifically induced diarrhoea. Theoretically this procedure allows the collection of a specimen of stool hurriedly evacuated from the small intestines, into which the gall-bladder has been stimulated to empty itself.

Such stool specimens should be collected into containers of selenite broth as supplied by the laboratory for this purpose and then promptly forwarded to the laboratory for cultural studies. If the test proves negative and there is still strong epidemiological evidence to indicate that the subject is a carrier, the test may be repeated and, if necessary, duodenal intubation considered.

OTHER LABORATORY INVESTIGATIONS

Phage typing. In South Africa phage typing of *S. typhi* is carried out on behalf of the Union Health Department by a research unit, under Professor Pijper and Dr. Crocker, which is attached to the Institute of Pathology of the University of Pretoria. Pure cultures of typhoid organisms that have been isolated from patients or carriers should be sent to this institute for phage typing, for such tests may offer very valuable epidemiological information whether cases of typhoid fever originate from one or more sources, and they may also help greatly to determine whether a particular carrier is the source of a particular epidemic. It is the practice of the Government Pathological Laboratories at Cape Town and Durban to send a culture of every typhoid bacterium isolated to this institute and as a result much useful epidemiological information has been obtained. This is a practice which is therefore recommended to all pathological laboratories in the Union of South Africa.

As the vehicle for the spread of typhoid fever is often water or foodstuffs, including milk, which have been accidentally contaminated by excrement from a patient or carrier, it is a wise procedure on the part of local health authorities to ask for bacteriological tests on properly collected samples of water or foodstuffs suspected on epidemiological grounds to be involved in the spread of typhoid fever during an epidemic, in order to ascertain whether there is any bacteriological evidence of faecal contamination of such water or foodstuffs. It must, however, be stressed that the finding of faecal pollution in the water or foodstuffs is not the final solution of the problem of the source. The final solution lies in tracing the carrier who polluted the water or foodstuffs, and until he is found the possibility of future epidemics must hang like the sword of Damocles over the community.

Team Work

It is obvious that the control of typhoid fever in the community must depend upon good team work and therefore there should always be the closest cooperation possible between the medical practitioners who discover the cases, the local health authority responsible for the public-health control of the disease, and the pathologist responsible for providing the necessary laboratory services. If these various persons all play their appropriate roles and act in concert, it should be possible, in many parts of South Africa, to score a decisive victory over typhoid fever.

SUMMARY

To control typhoid fever effectively in South Africa, full use should be made by medical practitioners and local health authorities of the free laboratory services provided by the Union Health Department. Laboratory tests allow:

(*a*) of the confirmation of the presumptive clinical diagnosis of typhoid fever,

(*b*) of a decision being made on when a patient is free of infection and therefore safe for discharge from medical surveillance, and

(*c*) of the discovering or proving of chronic carriers, who are ultimately responsible for all epidemics.

For the early diagnosis of the disease, blood and stool cultures are recommended and the Widal test is to be regarded as a laboratory test chiefly of historical interest.

For deciding when a patient is free of infection, repeated urine and stool cultures are necessary, The Vi agglutination test may also be of some possible value in this regard.

For the tracing of chronic carriers, the Vi test in South Africa has sometimes proved unreliable and its use is often abused by local health authorities. The tracing of chronic carriers depends first upon 'police' epidemiological investigations to find the suspects and secondly on bacteriological tests to prove which suspect is guilty. Whenever a case of typhoid fever occurs, every effort should be made by the local health authority to trace the responsible carrier.

Phage tests are of great epidemiological value and all cultures isolated from patients and carriers should be sent by laboratories to the Institute of Pathology, Pretoria, for phage typing.

To control typhoid fever, the closest possible cooperation is desirable between medical practitioners, local health authorities and public-health pathological laboratories.

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THE LABORATORY DIAGNOSIS OF TYPHOID FEVER

AN OUTLINE OF THE METHODS USED AT THE GOVERNMENT PATHOLOGICAL LABORATORY, CAPE TOWN

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The bacteriological diagnosis of typhoid fever is, for all practical purposes, dependent upon the recovery of *Salmonella typhi* from specimens of blood, faeces and urine, and to a lesser degree upon the measurement in the patient's blood of the specific antibody response to the flagellar (H) and somatic (O) antigens.

The techniques used at the Government Pathological Laboratory, Cape Town, for the isolation of *S. typhi* will be outlined. We have found these methods also suitable for the isolation of the other members of the salmonella-shigella group.

The essence of the scheme is to isolate non-lactose-fermenting organisms (into which category the salmonella-shigella organisms fall) from the specimen, to separate off from these the large group of proteus organisms by utilizing the fact that they rapidly hydrolyse urea, and then submitting the remainder to tests for motility, the ability to ferment dextrose, mannite, sucrose and salicin, to produce indole, and to form sulphide. An assessment of these biochemical properties permits of a presumptive diagnosis, and confirmation is obtained by agglutination tests with specific antiserum.

ISOLATION AND IDENTIFICATION OF S. TYPHI FROM STOOL AND URINARY SPECIMENS

Stools. On receipt at the laboratory each specimen of stool is plated onto selective differential media, viz. (*a*) McConkey's agar and (*b*) salmonella-shigella agar (Difco). About 1 g. of faeces is also emulsified into a tube of selenite enrichment broth which, after about 18 hours' incubation, is subcultured onto a plate of salmonella-shigella agar.

Urines. Equal quantities of the urine and of double-strength selenite broth are mixed and incubated for about 18 hours. Subculture is then made onto a salmonella-shigella agar plate.

Subsequent procedures. After 18-24 hours' incubation, all the McConkey and salmonella-shigella agar plates are examined for non-lactose-fermenting colonies with characteristics suggestive of pathogens. At least 6 suspicious colonies are then picked off and seeded into tubes of Singer's urea broth.[1] These tubes are incubated for about 6 hours and are then examined. Tubes showing an alkaline change from the rapid hydrolysis of the urea are discarded as containing proteus organisms. From those tubes which show no signs of urease activity or of lactose fermentation, subcultures are made into the following tubes of differential media: Kligler's iron agar (Difco), semi-solid mannite medium, sucrose-lactose-salicin medium and tryptone water. After 18-24 hours' incubation these tubes are examined for changes indicative of the presence of intestinal pathogens. The presumptive diagnosis of the type of organism suggested by the reactions in these tubes is then confirmed by slide agglutination tests with the appropriate specific antisera.

If *S. typhi* is identified, pure cultures of the organism on plain agar slopes are submitted to the Phage-Typing Unit of the Institute of Pathology, Pretoria, for phage typing.

This scheme we have found to be economic and reliable.

Kligler's iron agar[2] is a useful differential tube medium in that in a single tube of medium it is possible to confirm that the organism is a non-lactose-fermenter, and to decide whether it ferments dextrose (and whether with acid only or acid and gas) and produces hydrogen sulphide.

The semi-solid mannite medium is equally useful in that in one tube it can be decided whether the organism is motile, whether it ferments mannite and whether with acid only or acid and gas.

SLS medium, which contains sucrose, lactose and salicin, is useful in discarding organisms of the paracolon group, which may closely resemble salmonellas but can be differentiated by the fact that paracolons sooner or later always ferment one or more of these sugars, which the salmonellas never do.

Tryptone water is used to test for indole production (Kovac's reagent is used in the test).

The use of Singer's urea broth has the advantage that it not only indicates urease activity of the seeded organism but also, by virtue of the fact that it contains lactose, acts as a confirmatory test for the absence of lactose fermentation of the organism.

ISOLATION OF S. TYPHI FROM BLOOD CULTURES

As the chance of isolating *S. typhi* from blood cultures is virtually 100% in the first week of the disease, too much stress cannot be placed on the desirability of undertaking this procedure in all cases of clinically suspected typhoid fever, and it is regrettable that this most useful laboratory investigation is not called for more frequently. Blood specimens for culture are submitted in bile-salt broth media (5 c.c. of the blood in 100 c.c. of the broth), and on arrival at the laboratory are incubated overnight and then plated onto McConkey's agar, which, after 24 hours' incubation, is examined for characteristic growth. If this is present, tubes of Kligler's iron agar are inoculated and suspicious growths are then identified by slide agglutination tests. Absence of growth on primary plating necessitates repeated platings from the original broth on the 2nd, 4th and 8th days, before final discarding as negative. Usually, if *S. typhi* is present, it will be isolated on the primary plating. Occasionally only, clot cultures are performed from clotted blood specimens submitted for Widal tests.

ISOLATION OF S. TYPHI FROM CHRONIC URINARY AND FAECAL CARRIERS

As we feel a little sceptical about the value of the Vi test in tracing carriers, encouragement is given to the epidemiological approach to the problem and, once a few persons are suspect on epidemiological grounds, repeated specimens of stool and urine are submitted for cultural examination. Supplies of selenite broth are supplied to the health officials undertaking the investigations, and are seeded by them with the requisite amount of faecal material. These specimens, together with the urinary specimens, are forwarded to the laboratory, where the broths are subcultured onto a salmonella-shigella agar plate, and growths with the colonial characteristics resembling those of *S. typhi* are passed through Singer's urea media and thence subcultured only onto a Kligler's iron agar. Characteristic findings are confirmed by slide agglutination. The urinary specimens are dealt with as described above.

Where specimens of stool may be long delayed in transit, they may be preserved by the addition of Sach's solution,[3] obtainable from this laboratory on request. We have, however, seldom found this necessary with *S. typhi* specimens.

FORMULAE OF MEDIA

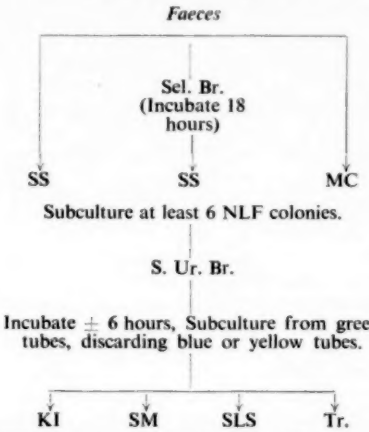
S.L.S. Medium. Peptone 10 g., sodium chloride 5 g., agar 3 g., distilled water 1,000 ml. These ingredients are steamed to dissolve, and after cooling the following are added:

Sucrose 10 g., lactose 10 g., salicin 5 g. Adjust the pH to 7·8. Add 10 ml. of Andrade's indicator and 4 ml. of a 0·4% brom-thymol-blue solution. The medium is dispensed in 5-ml. amounts in tubes and the tubes are steamed for 3 successive days for 15 minutes.

Semi-solid Mannite Medium: Proteose peptone 5 g., sodium chloride 5 g., agar 5 g., distilled water 1,000 ml. Adjust the pH to 7·8, and then add 10 g. of mannite, and 4 ml. of a 0·4% solution of brom-cresol purple. The medium is dispensed in 5-ml. amounts in tubes and the tubes autoclaved at 15 lb. pressure for 25 minutes.

Singer's Urea Medium: Difco tryptone 20 g., sodium chloride 5 g., distilled water 1,000 ml. These ingredients are steamed to dissolve and then cooled. The pH is adjusted to 7·3 and 4 ml. of cresol-red solution, 10 ml. of brom-thymol-blue solution and 10 ml. of thymol-blue solution are added. 100 ml. of 10% lactose solution and 80 ml. of 20% urea solution are then added by Seitz filtration. The medium is dispensed in 3-ml. amounts and incubated for 24 hours, and then refrigerated until required.

SCHEME FOR ISOLATION AND IDENTIFICATION OF PATHOGENIC ENTEROBACTERIACEAE



Incubate 18-24 hours. Do Gram's stain. Classify according to biochemical reactions. Confirm diagnosis of suspected pathogens by slide agglutination tests with appropriate specific diagnostic antisera.

DIAGNOSIS BY BLOOD CULTURE

1. Collect 5 c.c. of blood in 100 c.c. of B.Br. and incubate.
2. Subculture onto MC at end of 24 hours and, if necessary, at end of 2nd, 4th and 8th days before finally discarding as negative.
3. Subculture NLF colonies onto KI.
4. Confirm diagnosis of tubes, giving suggestive biochemical reactions by slide agglutination tests.

KEY

Sel.Br.=selenite enrichment broth. SS=salmonella-shigella agar (Difco). MC=McConkey agar. S.Ur.Br.=Singer's urea broth. KI=Kligler's iron agar (Difco). SM=semi-solid mannite agar. SLS=sucrose-lactose-salicin medium. Tr.=Tryptone water. B.Br.=bile broth. NLF=non-lactose-fermenters.

INTERPRETATION OF BIOCHEMICAL REACTIONS

S.Ur.Br. Blue colour=urea hydrolysis. Yellow colour=lactose fermentation.

KI. Yellow slope and butt=lactose fermentation. Red slope and yellow butt=dextrose fermentation. Splitting of agar=gas formation. Blackened butt=H_2S production.

SM. Growth confined to line of stab=non-motile. Growth diffuse=motile. Yellow colour=mannite fermentation. Fine gas bubbles=gas production.

SLS. Red colour=fermentation of sucrose, lactose or salicin.

Tr. Test with Kovac's reagent for indol formation.

DIFFERENTIAL PRESUMPTIVE DIAGNOSIS ACCORDING TO BIOCHEMICAL REACTIONS

Organism	*Motility*	*Dextrose*	*Mannite*	*Sucrose Lactose Salicin*	*Indol*	*H_2S*
S. typhi	+	A	A	—	—	+
Other salmonella	+ (−)	AG (A)	AG (A)	—	—	+ (−)
Sh. paradysenteriae (Newcastle) ..	—	AG	AG	—	—	—
Sh. dysenteria (Shiga)	—	A	—	—	—	—
Sh. ambigua (Schmitz)	—	A	—	—	+	—
Sh. sonnei	—	A	A	A (very slow)	—	—
Sh. paradysenteriae (Flexner and Boyd)	—	A	A	—	− (+)	—
Sh. alkalescens ..	—	A	A	—	+	—
Proteus group ..	+	AG	—	+	+ (−)	+ (−)
Proteus morganii ..	+	A (A)	—	—	+	—
Pseudomonas aeruginosa	+	A (−)	—	—	—	—
Alcaligines faecalis	+	—	—	—	—	—
Paracolobactrum	+ (−)	AG	AG (−)	+	+ (−)	− (+)

A=acid formation only AG=acid and gas formation

TESTS FOR (*a*) 'FREEDOM FROM INFECTION' OF CONVALESCENTS AND (*b*) DETECTION OF CARRIERS

Faeces

1. Forward to laboratory in Sel. Br. Incubate up to 18 hours.
2. Subculture onto SS. Incubate 18-24 hours.
3. Subculture at least 6 non-lactose-fermenting colonies onto S. Ur. Br. and incubate 6 hours.
4. Discard blue or yellow tubes. Subculture green tubes. onto KI and incubate 18-24 hours.
5. Examine KI tubes. Discard tubes which do not show red slope with yellow butt and no gas and (usually) blackening.
6. Do Gram stains of smear.
7. Do slide agglutination tests with Vi, H and O typhoid antisera.

Urine

1. Mix equal quantities of urine and Sel. Br. Incubate 18 hours.
2. Subculture onto SS and proceed as for faeces.

SUMMARY

An outline is given of the laboratory methods used in the Government Pathological Laboratory, Cape Town, for the isolation of *S. typhi* from specimens submitted.

The various media used are very briefly described, and a scheme for the isolation and identification of pathogenic enterobacteriaceae is given.

Official permission has been obtained from the Secretary for Health for permission to publish this paper. Thanks are also due to the Chief Regional Health Officer (Cape Town) and the Senior Government Pathologist (Cape Town) for their encouragement and guidance.

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TYPHOID FEVER : PREVENTIVE MEASURES

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Typhoid fever is world-wide in distribution. Generally speaking, the disease may become endemic wherever the water supply is subject to human excremental pollution, the standard of sanitation is low, the people are less enlightened, and overcrowding is present. By this standard, many rural areas in South Africa, particularly where there are big aggregations of Bantu, and also the peri-urban areas of the cities, where there is no water-borne sanitation or adequate, safe, reticulated, water supply, may not only be considered endemic, but even potentially epidemic. As a large proportion of the labour force in the cities and bigger towns is drawn from these areas, the situation can be likened to an unexploded bomb in the back garden, surrounded in some instances by an ornamental trellis.

The reservoir of infection is constituted by the permanent carriers, the transient carriers, the ambulatory cases, and also those diagnosed cases for whom there is no adequate isolation. The problem of preventing the spread of typhoid fever is one of pure basic hygiene, consisting in the blocking of the various paths by which the causative organism might pass in the faeces or the urine of an infected individual into the mouths of others. These routes are:

1. *Direct*, in which foodstuffs are contaminated with faeces or urine by the unwashed hands of carriers or cases. This may also occur with raw fruit and vegetables; urination in the lettuce patch and the use of human excreta as manure is not unknown in market gardens in some areas.

2. *Water supplies* may be contaminated by sewage from a mixed population or excreta from carriers or cases, the effects depending upon the degree of contamination. Gross contamination of public supplies may give rise to an epidemic explosive in character.

3. *Milk supplies* may be directly or indirectly contaminated by carriers or cases, with consequent infection also of milk products, such as cream, cream cakes, ice cream, immature cheese, etc. With infection of milk from a bulk source explosive epidemics may occur.

4. *Flies* may act as vectors. After they have eaten infected excreta they may regurgitate it onto foodstuffs to which they are attracted, or they may infect the foodstuff (including milk) by contamination from the surface of their legs or bodies.

Typhoid fever may occur at any age, but is commonest in older children and young adults. The incubation period is usually 9–14 days, but may range from 1–3 weeks.

The illness commences with malaise, lassitude, headache and pyrexia. This stage of vague toxaemia (bacteraemia) lasts about a week, during which time the patient is generally non-infectious. Having regard to the prevailing conditions of hygiene or the occurrence of confirmed typhoid cases in the district the practitioner should make use of available laboratory facilities, for blood culture is the only means of establishing the diagnosis beyond doubt in this important non-infectious stage.

After isolation of the case, all contacts should be observed for a period of 3 weeks. Those employed in the handling or preparation of foodstuffs should be excluded from this occupation during the period of observation.

The Permanent Carrier

It is the permanent carrier who is the original source of every outbreak. There are usually no short cuts in detection, and a thorough investigation of all the patient's movements and places of eating in the month before the onset of illness is frequently necessary before any clue can be obtained. More often than not the individual and his family are of a low standard of intelligence and extreme patience is required.

On detection, a carrier should be admitted to an infectious diseases hospital, where treatment should be given to bring the carrier condition to an end, if possible. Before discharge from hospital, permanent carriers are given instruction regarding their danger to others, the need to wash their hands after visiting the toilet, and if they reside in unsewered areas, the necessity for disinfecting the stercus pail after defaecation. They are forbidden to handle or prepare any foodstuffs, even in their own homes if this is possible. They may not go away on holiday, change their address, or except in emergency enter hospital without informing the local authority.

They should be visited at least once a month and the whole lecture repeated *ad nauseam*. Carriers often become

forgetful; they seem to live a long while and advancing years and forgetfulness frequently walk hand in hand.

The real danger to the community, however, is still the undetected carrier, and therefore the search must never cease.

General Preventive Measures

1. The provision of a safe, reticulated, piped water supply. Wherever water is suspect it should be boiled or adequately chlorinated before use.

2. The provision of a safe milk supply. Inspection from producer to consumer, with compulsory pasteurization and Vi testing of all personnel engaged in the plants (and also in ice cream factories), is the ideal. Any suspect milk supply should be boiled before use.

3. The provision of water-borne sanitation—or, where this is not possible, latrines which are fly-proofed and, especially in the rural areas, are made more comfortable than the surrounding bush.

4. The protection of all foodstuffs from contamination by dust, dirt, flies, etc., and the careful washing of fruit and vegetables before eating.

5. Adequate cooking and refrigeration of foodstuffs in order to avoid needless proliferation of organisms.

6. High standards of personal hygiene on the part of all engaged in the handling and preparation of foodstuffs, with particular reference to short nails and the washing of hands with soap and water after visiting the toilet, and before eating. Much direct typhoid infection would be prevented if habitual attention to the hands at all times were inculcated in the whole population. A nation-wide campaign, starting in the schools and spreading to every walk of life, would pay handsome dividends.

Special Preventive Measures

1. It is essential for the local authority to keep a register of all established permanent carriers. The phage type should be recorded; this may give valuable information in the investigation of typhoid outbreaks.

2. The search for the undetected carrier must never cease.

3. Active immunization may protect the individual against a clinical attack of typhoid, but not from infection or the possibility of a resultant carrier state. It is advised in the following conditions:

(*a*) It is indicated for persons who propose to reside in endemic areas where the standard of sanitation is low.

(*b*) As a routine it should be given to occupants residing in the homes of known permanent carriers.

(*c*) It is indicated selectively where there is a breakdown in the general preventive measures.

(*d*) Mass immunization has its place in the face of regional or national disasters, such as floods, droughts, earthquakes, wars, etc., in which there is a breakdown of essential services. If it is advised simply because of a high incidence of typhoid, it is liable to give a false sense of security, and completely subordinate the all-important principles of personal and general hygiene. It gives the impression of a tacit admission of defeat.

ELECTROCARDIOGRAPHIC STUDIES IV

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Case 4. Acute Hypokalaemia with Secondary Renal Changes and Renal Insufficiency.

This patient, a Coloured female aged 45 years, had been quite well until 6 months before her admission to hospital. She then noticed some swelling of her ankles and became unduly fatigued. These were the only complaints until 2 months before admission when she began to vomit, particularly after meals. Three weeks before admission she also developed abdominal colic and had a persistent diarrhoea, the stools having been green and watery in nature. This diarrhoea was still present on admission. She had lost weight and her appetite was poor.

On Examination

The patient was obviously malnourished and dehydrated. She was lethargic but cooperative. Pigmentation was evident over the exposed portions of her legs and on her face.

The patient was apyrexial; her pulse rate was 50 per minute, and her blood pressure 120/90 mm. Hg. Her tongue was dry. There was mild pallor of the mucous membranes of the oral cavity. On rectal examination a small amount of blood was left on the gloved finger. Her deep reflexes were subnormal. No other abnormal findings were present on physical examination.

Urine. Albumin ++. No other biochemical abnormalities. Microscopic examination: no abnormal findings.

Blood Examinations: Haemoglobin 10 g.%, white cell count: 16,000/c.mm., differential count normal.

Electrolytes: Potassium 1·4 mEq./l., sodium 129 mEq./l., chloride 89 mEq./l., and urea 233 mg.%.

Chest X-ray: Apart from a mild degree of emphysema and an old healed tuberculous process in the left upper lobe, there were no other findings.

ELECTROCARDIOGRAM

The sinus rhythm was 100 per minute, and the P wave was prominent in the standard leads. P–R 0·16 sec.; QRS 0·10 sec., QT not measurable on account of merging of T and U waves. In the

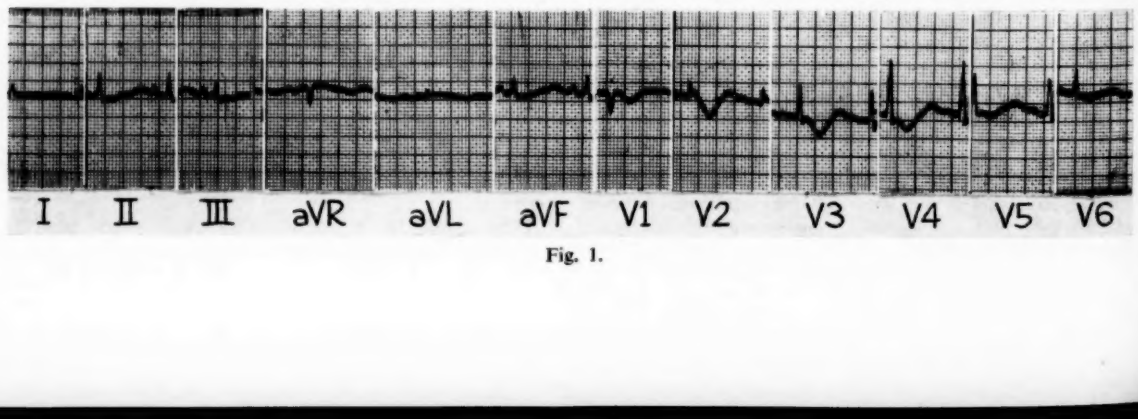

Fig. 1.

ST-segment depression was most marked in V3–V5. T-wave inversion was present in all leads with the exception of aVR, and the U waves were positive and prominent in V2–V6. (Fig. 1).

Diagnosis

The clinical diagnosis was that of severe malnutrition with secondary diarrhoea and vomiting resulting in dehydration with hypopotassaemia. The patient was also in renal failure which might have been the result of prolonged dehydration and hypopotassaemia.

She was treated actively with intravenous fluids and potassium chloride. Her condition failed to respond, however, and she died 3 days after admission.

Permission for an autopsy was obtained and the presence of severe malnutrition was confirmed. There was atrophy of the internal organs. Microscopically the kidneys appeared to have a bilateral cortical necrosis and the histological examination revealed the presence of severe hydropic degeneration of renal tubular epithelium which, together with oedema of the myocardial fibres, were considered to be the result of the hypopotassaemia (Prof. H. W. Weber).

DISCUSSION

The electrocardiographic pattern of hypopotassaemia is dependent on the relationship of the U-wave amplitude to the T-wave amplitude and on displacement of the ST-segment. In the typical pattern the amplitude of the U-wave is increased, the amplitude of the T-wave is decreased or negative, and the ST-segment is depressed. A tracing typical of hypopotassaemia is to be expected if the potassium concentration is below 2·7mEq./l. In patients with plasma-potassium concentrations exceeding 2·7mEq./l. a wide variety of electrocardiographic patterns may be found.[3]

Other electrocardiographic findings which may be present but are not considered directly related to the hypopotassaemia, are an increase in the amplitude of the P-wave and in the amplitude of the QRS complex, and an increase in the duration of P–R interval and of the Q–T interval. Abnormalities in the concentration of serum potassium affect the T-wave and the U-wave in opposite directions. In hyperkalaemia the T-wave tends to be high and pointed and the U-wave small. In hypokalaemia the T-wave is decreased in size or inverted and the U-wave exaggerated. If the U-wave is considered to be the result of an after-potential, then in hypopotassaemia this would mean a negative after-potential. In hypopotassaemia potassium readily leaves the cell during systole and returns slowly, with a resultant large negative after-potential and, presumably, a U-wave.[1]

The prolongation of a Q–T interval is either the result of a Q–U interval mistakenly labelled a Q–T interval, or the result of co-existent hypocalcaemia.[4]

The typical pattern of hypokalaemia may be expected in various clinical conditions such as periodic paroxysmal paralysis, certain cases of chronic nephritis, during a course of treatment of tuberculosis with para-aminosalicylic acid, in Cushing's syndrome, and in prolonged diarrhoea and dysentery. The pattern may develop in cases with intestinal obstruction and prolonged vomiting; it may occur in patients with diabetic coma, especially after treatment with insulin and after infusion of potassium-free physiological saline, and it may also occur in post-operative shock.[2] Patients undergoing therapy with steroid hormones, or those receiving diuretics such as chlorthiazide and similar preparations, may also develop hypopotassaemia. Hypersecretion of primary aldosterone may be an additional cause.

In this patient the diagnosis of hypopotassaemia could be made on the electrocardiographic findings and was subsequently confirmed by biochemical investigations. The condition appears to have been the result of chronic malnutrition with vomiting and diarrhoea. Furthermore, the renal changes which followed and resulted in acute renal failure are of particular interest.

OPSOMMING

Die elektrokardiografiese beeld van hipokalemie kon gedemonstreer word by 'n Kleurlingvrou wat aan 'n chroniese wanvoedingstoestand gely het oor 'n tydperk van 6 maande. Daar was meegaande braking en diaree. Akute nierversaking het gevolg op die toestand, en hidropiese degenerasie van die nefron asook edeem van die hartspier is na nekropsie bevestig. Die elektrokardiografiese kenmerke van hipokalemie bestaan uit 'n verhoging in spanningshoogte van U, met 'n verlaging in dié van die T-uitwyking. Daar is meegaande afwaartse verplasing van ST. Ander bevindings, soos 'n verhoging van die P- en QRS-komplekse, en verlenging van P–R en QT, is nie kenmerkend nie.

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A CLINICAL TRIAL OF STELAZINE IN THE TREATMENT OF MENTAL DISORDERS

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In view of the increasing encouraging reports on trifluoperazine (stelazine) in England, and especially in America, a trial of this drug was carried out at Valkenberg Hospital, Observatory, Cape. The results were assessed on purely clinical grounds.

Trifluoperazine is a new phenothiazine derivative with a long action which has been used in the treatment of mild mental and emotional disturbances and in the treatment of psychotic patients.

Thirty patients were taken at random from 6 wards for male Coloured patients. The European staff were briefed about stelazine and its possible side-effects, and in addition a film, supplied by the agents, was shown to both the European and Coloured staff. In spite of this, the trial had a mixed reception from the staff at the start, since they looked upon the drug as just another tranquillizer. The majority of the staff soon became very enthusiastic, but others remained apathetic. It is interesting to note that the results were better in those wards in which the staff were interested in the trial.

On drawing up the lists it was found that we had 27 schizophrenic, 1 manic depressive, 1 presenile and 1 feebleminded patient. The ages of the patients varied from 19 to 54, and they had been in hospital from 1 month to 6 years. All patients except the presenile, feeble-minded, and one schizophrenic patient, who was admitted with a fractured spine, had previously been treated with ECT insulin, and largactil, with no results. The manic depressive patient has had frequent relapses.

All patients were started off on low doses of stelazine, each receiving one 5 mg. tablet once a day. The dose was increased by 1 tablet every 3rd day until the patients were getting 6 tablets, i.e. 30 mg. a day. In a few cases the dose was increased to 40 mg. a day, but it was soon found that very few patients could tolerate that dosage. At the time our supply of stelazine was limited, and the trial lasted from 6 weeks to 2 months; the dose was then slowly reduced over a period of several days. No cases received any maintenance treatment after this period as suggested by the manufacturers.

Thirteen cases (33%) showed no side-effects. One case de-

veloped a rash which disappeared on reducing his dose. Quite a number of patients complained of not feeling well, and expressed anxiety. Motor restlessness was marked in some cases, 2 patients made daily attempts to escape, and one tried several times to scale the wall of the courtyard. During the early part of the trial a few patients were inadvertently sent out with the working parties and some of these patients had attacks of syncope while at work. From then on all patients on treatment were kept in the wards, but not in bed. Seven cases (23%) developed muscular spasm with rigidity and pain. This side-effect usually appeared during the early part of the trial. Nine cases (30%) developed parkinsonism (mask-like face, tremors, rigidity and shuffling gait). These side-effects were easily controlled by giving suitable medication, such as artane. The most unpleasant side-effect was difficulty in swallowing. This necessitated drastic reduction in dosage and in some cases stopping all treatment, as had to be done in the presenile and the feeble-minded patients.

One death occurred during the trial. A catatonic mute schizophrenic patient suffering from tuberculosis had been on treatment for 17 days, and was beginning to show some improvement by becoming more accessible and starting to talk, when he suddenly had an attack of acute pulmonary oedema and died. It is difficult to state whether stelazine had hastened his death or not. Kinross Wright and Klimczynski have each reported a death in their series, but under different circumstances. We encountered no liver dysfunction or blood dyscrasias during the trial.

Of the mental symptoms, hallucinations were the first to clear up. The patients developed more drive and started taking an interest in their surroundings. They became more tidy and repeatedly asked for work or to be allowed to go home. Mute cases started talking and answering questions, and delusions disappeared. Lastly, the patients developed some insight into their condition.

SUMMARY

The following is a summary of the results of our trial:

1. 10 cases (33%) showed marked improvement: 4 were discharged, 2 Governor-General's decision patients are fit for discharge, and 4 were sent out on leave; no relapses so far.
2. 4 cases (13%) showed moderate improvement.
3. 9 cases (30%) showed slight improvement; 4 cases relapsed.
4. 6 cases (20%) showed no improvement.

The impression gained from this trial is that stelazine is a useful drug, and that it appears to have a definite place in the treatment of severe psychotic conditions. High doses (15-30 mg. a day) should only be used while the patient is in a hospital or nursing home.

I wish to thank Dr. T. E. Cheze-Brown, Physician Superintendent, Valkenberg Hospital, Observatory, for allowing the trial to take place, and Dr. B. P. Pienaar, Commissioner for Mental Hygiene, for permission to publish this report.

CANCER*

LEWIS S. ROBERTSON, *President, The National Cancer Association of South Africa*, 1959

It is my privilege to report on another year during which the National Cancer Association of South Africa has made phenomenal progress.

Cancer as a disease is a major impediment to the health of the Nation. We know some of the ways in which the situation could be improved, for example, by tackling the problem of air pollution and smoking. Better methods of treatment have been devised. The real problem, however, is that the public's attitude to cancer is wrong. Cancer is still too widely regarded as incurable. A hundred years ago all cancers were fatal, but now the situation is very different. The facts are these: some cancers are serious and some still incurable; some become serious if not dealt with in time, and some taken in good time are curable. The medical view of cancer is that it is just one of the many serious diseases that afflict man, and should be regarded as an ordinary disease. We need to change the popular attitude to cancer in the way the attitude to consumption has been changed over the past few years.

When a disease is looked upon with fear, delay in seeking treatment is inevitable. When public opinion changes and comes to regard cancer as an ordinary disease, improvements in the number of cures will follow.

Cancer research, like cancer, knows no frontiers and the International Congress, held in London in July 1958, was evidence of this.

It must be admitted that there is as yet no sign of a solution to the fundamental problem of cancer; there is no sign of when we may be within striking distance of a solution, and there is as yet no sign of the precise direction the solution will take. All we can say at present is that the fundamental problem lies deep in the complexities of biology, that is, in the complexities of life itself. In the meantime, there is no need for despair. There are many forms of cancer which can be prevented and cured, and the list is growing.

While we advance on all fronts the most gratifying progress can be reported in regard to activities in the fields of professional information and public education. With reference to professional information, attention is invited to pages 10 and 11 of the Cancer Association's Annual Report for 1958, from which it will be noted that the Association has sent no less than 8 doctors and auxiliary medical personnel overseas at its expense where they were able to acquire the very latest information about advances in the diagnosis and treatment of cancer. These individuals are now able to apply their newly acquired knowledge for the benefit of the public, and moreover, they are able to convey the information to their colleagues. The Cancer Association can be justly proud of the share it has taken in the matter.

In this connection I am pleased to announce that the Cancer Association is playing a vital part in introducing into this country an important diagnostic aid in regard to the early detection of cancer. I am referring specifically to exfoliative cytology. An exfoliative cytology programme has to be developed in two stages. Firstly, the professional manpower has to be available—that is the pathologists and the skilled technical assistants, who must be trained in the highly specialized field of analysing exfoliative cytology smears. Two pathologists employed by the South African Institute for Medical Research were trained overseas at the Association's expense during 1958. I believe that they are already applying their knowledge to great advantage. Negotiations are in progress to import a highly skilled technician from Britain during 1960. He will be required to spend 6 months in South Africa, with the sole object of training a number of technicians drawn from all the medical schools and the South African Institute for Medical Research.

Once the professional man-power is available, it will be the task of the Association to make known to the general public that this excellent service is widely available, and I may mention that we are ready to commence with a major educational campaign at short notice.

Members will be able to form an idea of how vitally important this venture really is when I quote the words of that well-known American expert, Dr. Charles Cameron. He said: 'The problem of cervical cancer could be virtually eliminated, if we could persuade all women to be examined by the cytological method once a year—if we had the professional man-power to interpret the slides'. I may add to these words that this method does not apply only to cervical cancer, it is of almost equal significance in some other forms, for example, cancer of the gullet. I am sure the Council of Management will have the blessing of all members of the Association in regard to 'operation exfoliative cytology'.

I am not going to spend time on the public educational activities of the Association, except to draw attention to the Annual Report, which deals fully with the progress made. Reports are received from doctors that already there is a noticeable tendency for the public to seek early diagnosis and treatment, and most gratifying of all, are assurances from cured cancer patients that they are only alive today because they followed the advice of the Association to consult their doctors early, and thus enabled their doctors to

* Presidential Address, Annual General Meeting, The National Cancer Association of South Africa, Johannesburg, 22 July 1959.

diagnose their condition in the early stages of development and and to institute early and adequate treatment. It is regrettable that many people still consult 'quacks' and waste valuable time during which their cancers are allowed to spread unchecked until, in many instances, it is too late for cures to be effected.

As regards cancer research, the peculiar advantages which obtain in the Union of South Africa for studies of this nature should be emphasized. The different ethnic groups, each with their distinctive manner of life, differ profoundly in their susceptibility to cancer. A study of the cancers which develop in the South African races is furthermore relatively simple because of the availability of Western medical methods, well developed hospitals, universities and other scientific institutions. This makes it possible to study the different and often primitive conditions with highly advanced techniques.

Investigations which have already been carried out have made it clear that different groups show different susceptibilities to the various types of cancer, and it may be concluded that these differences are explicable on environmental grounds. Many examples could be quoted. Among these might be mentioned skin cancer which appears to be largely associated with the high exposure to sunburn in this country.

As regards skin cancer, South African Whites have the highest known death rate in the world. On the other hand, skin cancer is very rare in the pigmented Bantu, and in a Johannesburg study only 1/15th of the number of skin cancers were found in the Bantu compared to what would be expected from similar populations of American Whites. The Bantu albinos are however very much more susceptible and appear to be even more sensitive to the effect of sunlight than the indigenous White population.

Cancer of the stomach, large intestine and breast are common in Whites but rare in the Bantu. On the other hand, cancer of the stomach is extremely common in the Cape Coloured.

The Bantu has a much greater susceptibility to certain other cancers. It has long been known that cancer of the liver occurs with greater frequency in the South African Bantu—in fact it is more than 8 times as common as in the American White population. Cancer of the gullet is another of the types of cancer to which certain groups of the Bantu are peculiarly susceptible. It is common in Johannesburg and East London and very common indeed in some of the rural regions of the Eastern Cape Province. In other rural regions of the Eastern Cape Province, there is no evidence that this cancer is more frequent. The causes for these differences must be local. They can only be discovered by persons who are acquainted with local conditions studying the South African situation. The results of these studies, of course, will be of value to cancer research all over the world. Discovery of the reasons for these differences would show how to avoid or prevent cancer-producing stimuli. The existence of such hotbeds of particular cancers thus provide opportunities for understanding the cause and prevention of cancers, and the importance of these opportunities is well recognized overseas—in fact suggestions are occasionally made that overseas research workers should come to this country to explore the different conditions existing in this country. On the other hand, we believe that it is the responsibility of the local population to study its own cancer situation, because we feel that it can only be fully understood by those acquainted with local conditions.

The common tumours provide unequalled experience in treating cancers. Many of the tumours in the Bantu are so rare in the White races that medical institutions obtain too few cases for intensive studies. South African surgeons and radiotherapists have the opportunity of developing new methods for handling these growths.

It is possible for South Africa to undertake cancer research without in any way duplicating the work of the great overseas laboratories. Our opportunity to study the present racial differences will not last indefinitely, for conditions are changing. With continued adoption of the Western manner of life, the cancer pattern will tend to the norm for such countries.

During 1958 the Association made only a small contribution in the field of direct personal assistance to the cancer sufferer, but this is under review and, funds permitting, our efforts will be considerably expanded during 1959. A pilot scheme has been inaugurated in Cape Town where, with the cooperation of the St. John Ambulance Association, the Red Cross and the Noodhulpliga, the Association is assisting cancer sufferers by arranging transport to and from hospital, by giving them home help, and by assisting them with dressings, equipment and similar aids.

The expenses of the Association once again far exceeded its income. For this reason it has been decided from now onwards to launch annual appeals for funds in an effort to balance annual budgets. I have the fullest confidence that the Association can approach the public on the strength of its remarkable achievements during the past four years and that the public will support this cause.

42ND MEDICAL CONGRESS (M.A.S.A.), EAST LONDON, 27 SEPTEMBER—3 OCTOBER 1959
42STE MEDIESE KONGRES (M.V.S.A.), OOS-LONDEN, 27 SEPTEMBER—3 OKTOBER 1959

Members of the Association who are attending Congress are asked to note the following items:

Air Travel to East London

As a result of circumstances beyond the control of the Congress Organizing Committee, the new East London Airport will not be open in time for Congress although it was originally supposed to be ready by 27 September.

The official alternative, suggested by the South African Airways, is for members to travel by Dakota from Port Elizabeth to Kingwilliamstown and to complete the last 35 miles by taxi to East London. Unfortunately the Kingwilliamstown Airport is only a fair weather runway and is likely to be unserviceable during September and October which is the local rainy season.

In order to avoid inconvenience and to ensure certainty of arrangements for members travelling by air, the South African Railways and Harbours have undertaken to provide a luxury-bus service from Port Elizabeth to East London. This journey will take about 5 hours, but is most pleasant and will include a halt at Grahamstown (Rhodes University). The return fare will be approximately £5.

It is absolutely imperative that all members who intend travelling by air should notify the Hon. Organizing Secretary of Congress (Ensuco House, 10-12 Oxford Street, East London) before 31 August so that the necessary arrangements for road transport can be made.

In view of the fact that many travel agencies which undertake air reservations are not acquainted with these arrangements, *it is absolutely essential* that all air reservations to Congress be made through S.A.R. & H. travel bureaux which will be fully informed.

Distinguished Guests of Congress

A feature of the South African Medical Congress which is to be held at East London in September-October will be the presence and participation of a number of distinguished guests from England, the USA and other countries. Certain of these visitors will be asked to demonstrate their techniques to Congress members and other practitioners or students, and it is likely, as has happened with visiting specialists on other occasions, that practitioners may ask some of our guests to see special cases. These visiting members of Congress, not being registered under the Medical, Dental and Pharmacy Act of the Union, will naturally not have the rights which that Act confers on registered persons, and it is important that our members should take care not to expose our guests to the embarrassment they might suffer if they were asked to perform acts which they are not legally empowered to perform.

Under section 74 of the Act the Minister of Health, after consulting the South African Medical and Dental Council, may exempt from the registration requirements of the Act for a prescribed period any visitor who is engaged *inter alia* in demonstrating medical, surgical, dental or pharmaceutical techniques. Such exemption has been applied for in respect of some of our visitors and will cover the proposed demonstrations. The Act does not, however, give power to exempt from the registration requirements of the Act as regards consultations.

The provision of the Act which South African practitioners

must take care not to ask our visitors to contravene is contained in section 34 (1) (*a*), as follows: 'Any person not registered as a medical practitioner or as an intern who, for gain, practises as a medical practitioner or intern (whether or not purporting to be registered) or performs any act specially pertaining to the calling of a medical practitioner shall be guilty of an offence. . . .' It appears that the acceptance of a fee ('for gain') is an essential part of this particular offence. There are also other actions which the Act forbids unregistered persons to perform, e.g. the issuing of 'medical' certificates or other documents.

Under section 24 of the Act as amended, provision is made for the temporary registration of a person who has come or intends to come to the Union at the request of a registered medical practitioner to examine or treat an individual patient. A person registered under this provision is not authorized to examine or treat any other than the specified patient 'and such other patients as he may specifically be authorized by the Council to examine or treat'.

It is well that doctors in South Africa should appreciate the position of members of Congress who have come from abroad *vis-a-vis* the laws of the Union concerning medical registration and practice.

PASSING EVENTS : IN DIE VERBYGAAN

South African Society of Medical Women, Cape Town Sub-group. The Annual General Meeting of this Sub-group will be held in the Gynaecology Lecture Theatre, Medical School, Observatory, Cape, at 8.15 p.m. on Wednesday 5 August and not Friday 31 July, as previously announced. All medical women who are interested are invited to attend.

* * *

Research Forum, University of Cape Town. A meeting of Research Forum will be held on Tuesday 4 August at 12 noon in the Bennie de Wet Lecture Theatre, A-floor, Groote Schuur Hospital, Observatory, Cape. Prof. L. Eales will speak on 'Urine and stool investigations in the differentiation of the porphyrias as seen in the 3 racial groups in Cape Town'. All who are interested are invited to attend this meeting.

* * *

Red Cross War Memorial Children's Hospital, Rondebosch, Cape. The next meeting of the Postgraduate Seminar Series of lectures held under the auspices of the University of Cape Town, Department of Child Health, will be held in the lecture theatre of this hospital on Wednesday 5 August 1959 at 5 p.m. Dr. J. Rabkin will speak on 'The testing of intelligence in children'. All practitioners are welcome.

* * *

Dr. R. D. Allan has changed his address from 23 Fourth Avenue, Bellville, Cape, to 12 South Way, Pinelands, Cape. His rooms are at 111 Medical Centre, Cape Town. Telephone numbers: Rooms 3-5442, residence 6-1520.

Dr. R. D. Allan het sy adres verander van Vierdelaan 23, Bellville, Kaap, na Suidweg 12, Pinelands, Kaap. Sy spreekkameradres is Mediese Sentrum 111, Kaapstad. Telefoonnommers: Spreekkamer 3-5442, woning 6-1520.

* * *

Mr. W. Grundill, M.B., B.Ch. (Rand), F.R.C.S., F.R.C.S. (Edin.), of Bloemfontein, wishes to notify colleagues that he has changed his address from 6 West Burger Street, to 206 Medfontein, St. Andrew Street, Bloemfontein. Telephone numbers remain unchanged: Rooms 2041, residence 5735.

Dr. W. Grundill, M.B., B.Ch. (Rand), F.R.C.S., F.R.C.S. (Edin.), van Bloemfontein, wens kollegas in kennis te stel dat hy vanaf 1 Augustus 1959 sy adres verander van Wes Burgerstraat 6 na Medfontein 206, St. Andrewstraat, Bloemfontein. Telefoonnommers bly onveranderd: Spreekkamers 2041, woning 5735.

* * *

South African Institute for Medical Research, Johannesburg. A staff scientific meeting will be held in the Institute Lecture Theatre at 5.10 p.m. on 10 August 1959. The following papers will be presented:

N. J. M. Richardson: 'Salmonella and shigella infections in rural Bantu schoolchildren—a twelve months survey'.

D. E. Munday: 'Some applications of microscopic histochemistry'.

R. G. Robinson: 'Some further work on the isolation of *S. typhi* from sewage'. Tea will be served and visitors will be welcome.

* * *

Research in the field of human trichomoniasis. Following the symposium on human trichomoniasis held at Rheims in May 1957, a conference of international representatives was called under the chairmanship of Dr. Gaston Chappaz. This resulted in the formation of an international group to maintain interest and to pursue further studies in this field. Groupe International d'Etudes de la Trichomonase Humaine (GIETH) has been constituted a permanent commission under the auspices of the Union Internationale Contre le Peril Venerien et les Treponematoses with headquarters at Institut Alfred Fournier, Paris. The objectives of the study group are as follows: (1) To set up an international registry of research workers interested in the field of human trichomoniasis; (2) to promote international scientific meetings—GIETH has participated in the organization of the First Canadian Symposium on non-gonococcal urethritis and human trichomoniasis to be held at Montreal, 21-22 September 1959 (Secretary, Dr. Z. Gallai, 8580 Esplanade, Montreal 11, Canada); (3) to aid in the publication of original articles or their abstracts in various foreign journals; and (4) to assist research workers in contacting the many public and private organizations for grants.

All research workers and other persons particularly interested in this field are urged to become members of this organization by sending the following information to GIETH, Institut Alfred Fournier, 25 Boulevard St-Jacques, Paris XIV°, France: (*a*) Name and address, (*b*) present university and/or hospital appointments, (*c*) bibliography of publications relative to the subject—trichomoniasis, and (*d*) current interests and investigations.

BOOK REVIEWS : BOEKBESPREKINGS

PHYSIOLOGY OF THE EYE

Applied Physiology of the Eye. By H. Willoughby Lyle, M.D., F.R.C.S., assisted by T. Keith Lyle, *C.B.E.*, M.A., M.D., M.Chir., M.R.C.P., F.R.C.S. Pp. vii+341. 32 figures. 45s. London: Baillière, Tindall and Cox Ltd. 1958.

While this volume may well find itself included as a reference book in the libraries of ophthalmologists I feel that it will mainly be used by postgraduates preparing themselves for higher diplomas in ophthalmology.

The opening chapters are devoted to a comprehensive account of the physiology and anatomy of the eyeball, and give short accounts of affections of the various parts of the eye together with their causes—especially the rarer causes. The connections of the eye with the brain are dealt with in great detail. This applies not only to the retina and optic nerve on its way to the occipital lobe but also to the extra-ocular muscles and their innervation. The effect of lesions on the function of these connections is well demonstrated. Each lesion is dealt with separately and, with the aid of excellent diagrams, a clear picture is established in the minds of the reader. The endocrine system as a whole is dealt with, with special reference to the pituitary. Chapters on diabetes mellitus, vitamins and allergic ophthalmology conclude this interesting book.

It is sad to think that Professor Willoughby Lyle did not live to see the publication of this volume, into which he put so much work.

M.F.

EAR, NOSE AND THROAT AND MAXILLOFACIAL SURGERY

The Year Book of the Ear, Nose and Throat 1958-59. Edited by John R. Lindsay, M.D. with a section on *Maxillofacial*

Surgery, edited by Dean M. Lierle and William C. Huffman, M.D. Pp. 395. 114 figures. $7.50. Chicago: The Year Book Publishers, Inc. 1959.

This little year book has in the past been of great value to the practising ear, nose and throat surgeon in enabling him to keep abreast of the flood of current literature. This year's publication is well up to the standard of its predecessors and admirably fulfils this purpose. The book is of particular value in that pertinent articles from journals not normally read by ear, nose and throat surgeons are included amongst the summaries. The abstracts are well done and convey all the essential information so that, unless one is especially interested in details, it is unnecessary to consult the originals. The periodic editorial comment is pithy and to the point. Finally the printing and general presentation are good. The book is warmly recommended. D.V.M.

ADVANCES IN CLINICAL CHEMISTRY

Advances in Clinical Chemistry. Edited by Harry Sobotka and C. P. Stewart. Vol. I. Pp. xi+398. 9 figures. $12.00. New York and London: Academic Press Inc. 1958.

The present volume deals with plasma iron, tubular kidney function, protein-bound iodine, radio-active iodine in the diagnosis of hyperthyroidism, determination of individual adrenocortical steroids, 5-hydroxyindoles, paper electrophoresis in clinical investigations, composition of body fluids in childhood and transaminase activities in body fluids.

Each section is written by acknowledged and experienced experts in their respective fields in the form of reviews covering technical procedure in detail as well as clinical application and interpretation. Bibliography is comprehensive, if not exhaustive, and covers current publications as recent as 1957. The clinician and practitioner may find some sections heavy going, for clinical chemistry, or chemical pathology, is of necessity a subject demanding both technical and clinical proficiency. Nevertheless here is an attempt to bring together the technical and clinical worlds in a number of volumes and to collate the widely scattered literature in selected subjects. In this volume the clinician will find much to help him—the chemical pathologist will find it sheer joy.

S.M.J.

CORRESPONDENCE : BRIEWERUBRIEK

ANAESTHESIA AND ANALGESIA IN OBSTETRICS

To the Editor: I have read Dr. Feinstein's letter[1] with interest and have nothing to add to the excellent account of an alternative technique for pudendal block anaesthesia which he advocates.

With reference to Dr. Jan Pretorius' letter[2] I regret that I am at a loss to understand why he hastened to put pen to paper before thoroughly reading the article concerned.

A more detailed perusal of the criticized passages would have revealed to him that the respiratory depressant action of pethidine, its ability to produce occasional shock-like reactions (as shown by pallor, sweating, nausea, vomiting and hypotension), as well as its habit-forming quality, have been mentioned. The dose of pethidine for intravenous use was unfortunately omitted.

As regards his comments on what he refers to as an 'abridged generalization' on general anaesthesia for Caesarean section, Dr. Pretorius would be well advised to re-read this section. He will then realize that not only have I 'covered a multitude of problems and lurking evils' by advising intubation of a cuffed endotracheal tube, but the 'occasional anaesthetist' has clearly been warned about the danger of inhalation of gastric contents. Pre-operative gastric aspiration, as well as the availability of an efficient suction machine, have been particularly stressed. My observations were purposely prefaced with the remark that it was not my purpose to discuss detailed anaesthetic techniques for major obstetric procedures in this paper, but it was felt that for the sake of completeness, mention should be made of this method along with others such as epidural and spinal anaesthesia.

406/7 Medical Centre
Heerengracht
Cape Town
16 July 1959

A. M. Michael

1. Correspondence (1959): S. Afr. Med. J., 33, 592.
2. *Idem* (1959): *Ibid.*, 33, 592.

LITERATURE ON PHARMACEUTICAL PREPARATIONS

To the Editor: A large portion of the daily mail of every practitioner contains pamphlets describing various pharmaceutical preparations offered by various firms. This literature is substantially increased by the supply which is delivered by the pharmaceutical representatives, of whom an increasing number are visiting us.

The literature to which I refer is of varying size and shape and, with the best will in the world, it is impossible to peruse it all or to keep it. Thus most of this literature, produced at no little expense (thus adding to the expense of the eventual product) is put into the waste-paper basket or stored in some inaccessible place, where it is of no use to the receiver or the sender.

In the event of one requiring information about a product, the information has either been lost or is under other, at the moment, useless folders.

Would it not be possible for the pharmaceutical houses to come to an agreement whereby they could standardize the essential information about a product by using a card or sheet which could be filed in a loose-leaf file or in a card index? If the firm concerned wishes to send other voluminous literature, it is its own affair, but at least the practitioner will have access to the essential points of each preparation.

The forthcoming Medical Congress at East London could provide a good opportunity for the pharmaceutical manufacturers to come together to decide on such a programme. I would suggest a card, e.g. 6×4 inches which could be coloured differently for the various firms, but which would have the preparations indexed by a trade name on one side and the chemical name on the other. We could then file them in whichever order we prefer.

I. J. Grek

50 Essanby House
173 Jeppe Street
Johannesburg
10 July 1959

STERILIZATION FOR SEXUAL OFFENCES

To the Editor: It was with great interest that I read Dr. W. P. Steenkamp's letter[1] regarding the possibility of sterilization or castration in sexual offenders. There is no doubt that the views of the medical profession should be aired in this matter.

As the question is very complicated, any legislation introduced will have to be carefully considered. That castration or sterilization will make a psycopath into a 'useful member of society' is doubtful. There is a large element of mental abnormality in psychopathic personalities which cannot be rectified by operation and, in fact, operation cannot be regarded as being of very much use in changing the mental outlook of recidivists. It will also hardly render society any safer from sexual offences, since the conditioned mental pattern will only drive the 'sex addict' to other and, possibly worse, sexual misdemeanours.

The ethical question involved here will probably raise many varied opinions. As far as this is concerned, it is felt that society should be protected from sexual offenders; and there are many more reasons for considering a life-sentence in these cases than in, for instance, the case of a man who kills once in a fit of passion.

Another moot point should perhaps be brought up here: surely it is time that the question of legalizing abortion in these unwilling victims of sexual offences should be borne in mind. After all, the two issues are very closely linked. I hope that this subject will also be considered by the 'prominent member of Parliament'.

192 General Hertzog Road
Three Rivers
Vereeniging
8 July 1959

C. E. Bloch

1. Correspondence (1959): S. Afr. Med. J., 33, 572.

STERILISASIE VIR SEKSUELE OORTREDINGS

Aan die Redakteur: Dit is verblydend dat daar uiteindelik planne beraam word teen seksuele oortredings.[1] Ons het in hierdie gevalle te doen met Blanke psigopate, enersyds, en Bantoe aanranders, andersyds. In geen een van hierdie gevalle sal sterilisasie sonder kastrering effektief wees nie. Hier het ek veral Bantoes in gedagte.

Sterilisasie sonder meegaande verwydering van die seksskliere sal loutere gekheid wees. Dit sal herhaling van die wandade *nie* effektief kan verhoed nie, en dit is juis die hele doel in hierdie verband. Die ondervinding het hopelik al geleer dat die doodstraf in dergelike gevalle nutteloos is; *die afskrikwaarde daarvan is feitlik nul*, en daar is vermorsing van werkkragte. As die kwaad doeltreffend uitgesny moet word, is kastrering die aangewese weg, en dit is vir Blanke en Bantoe psigopate sowel as ander seksoortreders toepaslik en afdoende.

Ek ken die Bantoe. Daar is niks waarvoor alle Bantoemans so 'n vrees koester as juis vir die verlies van hul manlike vermoëns deur kastrering nie. Hulle sal die dood dáárbo verkies. Kastrering word derhalwe aanbeveel en wel om die volgende oorwegings:

1. Die afskrikwaarde daarvan is hoër as die van die doodstraf omdat dit meer gevrees word.

2. Die gekastreerde word en bly 'n lewende waarskuwing vir sy stamgenote. Sy toestand kan nie verborge bly nie; die feite sprei gou en ver rond onder die massas en dit sal die plaag effektief beëindig. Die doodstraf, darenteen, word in die geheim voltrek en bly vir die groot massas 'n geheim. Daarom skrik dit so uiters min af.

3. Kastrering werk behoudend-afwerend. Die gekastreerde leef voort en bly vir die samelewing produktief en bruikbaar. Die doodstraf verkwis mannekrag terwyl die uitwerking daarvan op ander twyfelagtig van aard bly.

4. Daar behoort minder beswaar teen kastrering as teen die doodstraf te wees. Kastrering is mensliker, definitief meer afskrikwekkend, behoudend, en op Blank sowel as nie-Blank van toepassing.

5. By psigopate sal sterilisasie (anders as deur kastrering) beslis sy doel mis want die abnormale drange word daardeur nie uitgeskakel nie.

G. C. A. v. d. Westhuyzen

Boshof, O.V.S.
8 Julie 1959

1. Briewerubriek (1959): S. Afr. T. Geneesk., 33, 572.

METAHEXAMIDE

To the Editor: In common with workers in the USA[1] and in Germany[1] we have recently discontinued the use of this powerful hypoglycaemic agent (N-3-amino-4-methylbenzolsulphonyl-N′-cyclohexylurea) after a 5-month's trial in 86 Natal Indian diabetics. During the course of this short trial in a group of patients who are usually unduly tolerant of the oral hypoglycaemia agents, we considered the toxic side-effects to be too frequent to be compatible with the routine use of the drug. All our patients, with one or two exceptions, were on 100-150 mg. of the drug daily, and the side-effects included the following: In 10 patients out of 80 there was severe burning of the feet, in 5 dermatitis medicamentosa (including one very severe exfoliative dermatitis), occurred, and in 2 there were hypoglycaemic episodes (one severe). These reactions necessitated stopping the treatment with metahexamide.

Bearing in mind the general unreliability of the complaints of the Natal Indian patient, the commonest complication was that of severe burning of the feet, which we felt we could distinguish from the complaints generally associated with the presence of diabetic neuropathy, and which disappeared after the administration of the drug was stopped. Skin complications appeared between 3 and 6 weeks of starting treatment, and 4 patients developed an erythemato-squamous eruption of the neck, face, elbows, chest, back, and the back of the legs. There was one severe case of exfoliative dermatitis necessitating immediate admission and energetic treatment; in this case blood counts and liver function tests were within normal limits. Two cases developed hypoglycaemia, both after 2 weeks of treatment; the one was an intelligent woman, who well knew the symptoms of insulin hypoglycaemia, and who said that she had to spend the 'whole day sipping a sugar solution to stop falling into a faint'. Two patients took twice the maximum recommended dose (i.e. 300 mg. daily), for 2 weeks without any ill effects. No case of jaundice was seen, and though a few patients ascribed their headaches to the drug, these symptoms disappeared without stopping their treatment.

In view of our observations in the Natal Indian patients, we feel (in common with the workers in the USA and Germany mentioned above), that metahexamide is neither a safe nor a desirable drug to be used in the treatment of diabetes.

1117 Colonial Mutual Buildings
West Street
Durban
14 July 1959

G. D. Campbell
Physician
W. G. McNeill
Registrar, The Diabetic Clinic, King Edward Hospital, Durban

1. Personal communication (1959).

MEDIESE INLIGTING EN DIE OPENBARE PERS

Aan die Redakteur: In die jongste uitgawe van *Die Huisgenoot*, nl. dié van 10 Julie 1959, verskyn 'n artikel oor ‚Die Wêreld se Nuwe Wondermiddel: Koue' uit die pen van 'n joernalis. In die artikel word onder andere groot ophef gemaak van die eksperimentele verkoeling van 'n hond in die Afdeling Snykundige Navorsing van die Universiteit van Kaapstad. Die hond is na 'n temperatuur van ongeveer 6°C afgekoel en na stilstand van die asemhaling, hart en sirkulasie, wat ongeveer 45 minute lank geduur het, is hy weer verwarm en het hy die eksperiment oorleef. Hierdie werk wat in Kaapstad gedoen word, is interessant en van groot belang, maar ek voel tog dat die ‚senior navorser' wat die inligting en die foto van die hond aan die verslaggewer gegee het, aan sy kollegas in Suid-Afrika op die volgende punte 'n verduideliking verskuldig is:

1. Waarom maak hy hierdie belangrike werk aan 'n verslaggewer van die openbare pers bekend voordat hy dit in die mediese pers gepubliseer het? In die geval van hierdie besondere artikel dink ek nie dat die inligting wat verskaf is onmiddellike gevaar vir die publiek inhou, soos die geval was met sekere ander artikels in afgelope jare nie. Volgens my mening is dit egter 'n verkeerde beginsel om die publiek te trakteer op sensasionele berigte van geneeskundige navorsing voordat hierdie navorsingsresultate aan die meer kritiese oordeel van die geneeskundige beroep onderwerp is.

2. Waarom het hy nie gesorg dat dié deel van die artikel waarvoor hy die inligting verskaf het ten minste 'n akkurate weergawe van die feite is nie? Ek verwys hier na die growwe onjuistheid (in vet letters) in die bewering dat, sover bekend, die Universiteit van Kaapstad die enigste plek in die wêreld is waar een van die hoër soogdiere soos die hond op hierdie manier (d.w.s. deurmiddel van verkoeling met 'n hartlong-masjien) tot so 'n lae temperatuur afgekoel is. Gollan en sy medewerkers het reeds in 1955, en weer daarna, die resultate van hulle eksperimente gepubliseer waarby afkoeling van *honde* tot omstreeks 5°C *op hierdie einste manier*, nl. deur die gesamentlike gebruik van hartlong-masjien en verkoeling, uitgevoer is.[1,2] Selfs wat Suid-Afrika betref is hierdie verklaring nie waar nie, want dieselfde metode van verkoeling met behulp van die hartlong-masjien word ook elders in ons land ‚op hoër soogdiere' toegepas.

Wat ook al die verklaring in verband met hierdie bepaalde artikel mag wees, lyk dit vir my dringend nodig dat die Mediese Vereniging die hele vraagstuk van die verskaffing van inligting aan die openbare pers (al is dit sonder vermelding van name) in oënskou moet neem om te probeer voorkom dat artikels wat op sulke inligting gebaseer is, die publiek mislei of die etiese status van die geneeskundige beroep skade berokken. Ek besef dat die publiek oor vordering op geneeskundige gebied ingelig behoort te word, maar dit skyn asof een of ander reëling getref sal moet word om te sorg dat *akkurate* inligting op die regte manier gegee word.

J. K. Bremer

Van Riebeekgebou 409
Pretoria
16 Julie 1959

1. Gollan, F., Phillips, R., Grace, J. T. en Jones, R. M. (1955): J. Thorac. Surg., 30, 626.
2. Gollan, F., Grace, J. T., Schell, M. W., Tysinger, D. S. en Feaster, L. B. (1955): Surgery, 38, 363.